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ABSTRACT

This paper addresses itself to four major areas relevant to the study and understanding of the relationships between man, as a person and as a social being, and the scientist, his society and his science. The essay presents four phases of a value clarification strategy and definitions of student verbal statements associated with these phases. Four teacher interrogative behaviors relevant to the design of and implementation of the "value sheet" are identified. Six formats of the value sheet are presented with examples of each format provided. The instructions on how the classroom teacher can construct his own value sheets are presented. As used in this essay, the value sheet is defined as a planned learning activity designed to encourage students to express, examine, and organize their values and feelings; and as a planned activity that can be employed as part of on-going inquiries in the science classroom. Value clarification refers to language patterns employed by students, used as a basis for inferring that they are comprehending, conceptualizing, and valuing knowledge about man and society. (Author/EB)

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Value Clarification: Clarifying Relationships Between Science and Society Using the Concept of the Value Sheet

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VALUE CLARIFICATION: CLARIFYING RELATIONSHIPS BETWEEN SCIENCE AND SOCIETY USING THE CONCEPT OF THE VALUE SHEET

J. Doyle Casteel, Robert J. Stahl, and John J. Koran[1]

Science has consistently influenced the ways in which members of Western societies know, think, value, structure their feelings, and act out their commitments and decisions. This includes both the beliefs and disbeliefs men hold about themselves, about others, about space and about time. Conversely, science is influenced by the ways in which members of a society come to know themselves, think about themselves, value themselves, inquire into their own behavior, structure their feelings, and choose to behave. This includes personal views men hold with regards to how science will be perceived, as a burden or a worthwhile social investment. As a people use and perceive how they might use scientific knowledge and procedures, the individual, his society, his culture, and the community of scientists are all affected (Casteel and Yager, 1966).

Science is often viewed exclusively as a cold, deliberate, non-humane pursuit of data, theories and verifiable inferences employing a definite set of procedureal rules. Neither science

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[1]The authors wish to express their appreciation to Dr. Paul DeHart Hurd, Professor Emeritus, School of Education, Stanford University, for his review of this manuscript and helpful comments.

nor society profits from this view. While science, as it is organized and explained, does stress the pursuit of knowledge and does utilize specific methodologies, scientific knowledge, as it is discovered and its uses considered, also possesses a human element too often ignored or overlooked (Hurd, 1970). Because men as human beings do have preferences and feelings and given the interactive nature of science and society, an adequate view of science must embrace both the substantive and human element (BSCS, 1972, 1973).

Men in society find that their preferences, decisions, feelings, ethical norms, and moral beliefs impinge on one another and on the way they perceive and interpret the world. Despite the fact that men do consider the likely personal and social consequences of their decisions and behaviors, they do make decisions that are sometimes irrevocably harmful to other men. At these times and others, men find it necessary to explain and justify their decisions and preferences. Scientists sometimes find themselves in such situations and are called upon to defend or explain their behavior. There is no reason to assume that the scientist, as a human being, is different from other men or that he should be stereotyped as less than humane.

As a man and as a member of the scientific community, the scientist finds and sees himself as a responsible agent in his society. Furthermore, he conducts his inquiry in association with other scientists and scholars who are aware of and subject

to the same personal and social factors as he. Because of the extensiveness of the interrelationships which exist among man, science and society, students of science can (and should) explore, examine, and consider the human element of man as he affects and is affected by science. By incorporating such inquiries into the study of science, the personal and social elements of science that impinge upon the scientist--his need to assign value ratings, the fact that he has feelings and emotions, and the responsibility he has to make decisions and act upon them--can be better understood as students acquire and use scientific knowledge.

This paper addresses itself to four major areas relevant to the study of and understanding of the relationships between man, as a person and as a social being, and the scientist, his society and his science. These areas embrace four purposes:

. . . To communicate one approach by which students can clarify relationships among science, society and the individual.

. . . To articulate and visualize four phases of a value clarification strategy which incorporates the concept of the "value sheet".

. . . To identify and articulate verbal behaviors consistent with the approach presented.

. . . To distinguish six different formats of the value sheet to the degree necessary for teachers to design

and use value sheets as a means of helping to clarify relationships between science and society. Each of these purposes is a valid one for both teachers and their students and is of critical concern to curriculum development, instruction and learning in science.

With these purposes in mind, the remainder of this essay is organized into four separate but interrelated parts. First, four phases of a value clarification strategy will be presented and student verbal statements associated with these phases are defined. Second, four teacher interrogative behaviors relevant to the design of and implementation of the value sheet are identified. Third, six formats of the value sheet are presented with examples of each format provided. Fourth, instructions on how the classroom teacher interested in using the six formats of the value sheet can construct his own value sheets are presented.

As used here, value clarification refers to language patterns employed by students that can be used as a basis for inferring that they are comprehending, conceptualizing, and personalizing knowledge about man, his society and his culture. Inasmuch as the value sheet can help students objectify, clarify, and communicate the values they hold and assign as their values are related to the study and application of scientific knowledge, the value sheet is applicable to the science classroom and the

teaching of scientific knowledge. As used in this essay, the value sheet is defined as a planned learning activity designed to encourage students to express, examine, and organize their values and feelings; and as a planned activity that can and should be employed as part of on-going inquiries in the science classroom. The value sheet can be used as a model for planning value clarification activities - in its concrete manifestations and in alternative formats and as a guide to appropriate instructional and student behaviors - and can provide a vehicle through which the relationships between science and society can be clarified.

The operational definitions provided above are used consistently throughout this essay. To review, these definitions are:

Value clarification - Refers to patterns of verbal behavior that can be used as a basis for inferring that people are comprehending, conceptualizing, and valuing knowledge about man and society. Clarification of the relationships between science and society then, refers to patterns of language that can be associated with student comprehension, conceptualization and valuation of knowledge about science and society.[2]

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[2]The categories of student behaviors identified in this paper and logical configurations of these categories are explained in a forthcoming monograph, J. Doyle Casteel and Robert J. Stahl, The Social Science Observation Record: Theoretical Construct and Pilot Studies, P. K. Yonge Research Monograph No. 7, College of Education, University of Florida, 1974. Copies are available from Dr. J. B. Hodges, Director.

Value sheet - Refers to a planned instructional activity or exercise deliberately designed and implemented to elicit from students value clarification patterns of language usage. The value sheet as conceived here also assumes that such activities and exercises are designed and used as one aspect of conceptually designed units of instruction.

Value clarification, as defined, can occur in four phases.

Four Phases of Value Clarification

The value sheet can be conceived of as a learning activity designed to stimulate students to participate in a minimum of three different and distinct phases of language patterns associated with value clarification. By adding a fourth phase of inquiry, individual value sheet episodes can be converted into a value clarification learning strategy enabling students to know, conceptualize and valuate their personal preferences, emotions, behaviors and predispositions to behave. The four phases of value clarification are: 1) comprehension, 2) relational, 3) valuation, and 4) reflective. Each of these four phases is outlined below.

Phase I: The Comprehension Phase. Phase I stresses student comprehension of a learning resource relevant to a concept, idea, or topic being learned, used, studied, or evaluated. This resource can take numerous forms such as: a reading

a picture, a table of statistical data, a cartoon, a poem, a field trip, or an experiment. Students are encouraged to identify and remember substantive data included in the resource as well as to demonstrate their understanding of this data as an indication of their comprehension of the resource and the data included in the resource.

The categories of student statements which make possible the language patterns associated with this phase of value clarification are topical, empirical, interpretive, definition, and clarifying. Give a resource, the teacher should expect to hear:

1. Students expressing topical statements. They identify or list the topic, the unit, the idea, or the concept that is the focus of the inquiry.
2. Students expressing empirical statements. They identify or list specific verifiable data and information recalled from memory or related to what they have read, heard, observed, seen, etc. Statements identifying the who, what, when, and where of a resource or observation are common examples of this category of student statement.
3. Students expressing interpretive statements. They reveal the meanings they have assigned to data, an experience, or an idea. These statements take the form of notions, opinions, interpretations, impressions,

views, conjectures, relationships, comparisons, estimations, and conclusions.

4. Students expressing statements of definition. They state what a word, a term, a phrase, etc. means or signifies. Statements as to the meaning of a word or concept can be by reference to an accepted source, by context, by examples, by operational criteria, by relevant attributes, or by ideal type.
5. Students expressing clarifying statements. They reword, rephrase, restate, elaborate on or expand on statements previously made. These statements provide for clarity and understanding of what has previously been said.

Students can use all five of these categories of statements during the first phase of value clarification.

Value clarification occurs with reference to a social and scientific context. Before students can react knowledgeably, they must learn relevant data and determine the meaning of this data as it supports interpretations of the situation or resource given. Students cite relevant data in the form of empirical statements and share their ideas as to what the data means using interpretive statements. Empirical and interpretive statements are used conjunctively during this phase of value clarification. When value clarification activities are planned as integral elements of conceptually designed units, empirical and inter-

pretive statements are used to tap this resource. Students responding to a situation within the framework of a conceptual unit possess knowledge of common data and ideas relevant to and often analagous to the data and ideas presented in the situation that is to be valued. During the comprehension phase, students can review and pool this data and frame other inferences about the data. The review of knowledge, pooling of data, and making of inferences take the form of empirical and interpretive statements. These two categories of student behavior enable students to develop and share an understanding of the situation that is to be the object of valuation in the light of the data, knowledge and ideas they possess.

Topical statements are used to help students review or determine the meaning of the focal concept or topic. Unless this is accomplished during the comprehension phase of value clarification, both the relational and reflective phases of value clarification are weakened. Defining and clarifying statements are used when students need to determine the meaning of words, the relevant attributes of concepts, or to restate their ideas in other ways so that they are better understood. While defining and clarifying statements are not always critical elements of the comprehension phase, evidence that students have used these categories provides the teacher with some basis for inferring that students sought to communicate effectively with one another. Therefore, when students have identified

and pooled factual information, interpreted and explained the data, and demonstrated their understanding of the concept that is at the focus of instruction, they have completed the comprehension phase (Phase I) of value clarification.

Phase II: The Relational Phase. Phase II stresses student understanding of the situation or the resource in the light of the concept being studies as the focus of study. During the relational phase, students identify, explore, examine and interpret the connection(s) that exists between the data and information included in the resource and the concept, idea, or topic being studied. Once this is accomplished, students are encouraged to clarify their understanding of these relationships by further explanation of and elaboration on the connections identified by the group.

The categories of student statements identified with the relational phase of value clarification are: topical, empirical, interpretive, defining, clarifying, and critical. During this phase of value clarification, the teacher expects to find:

1. Students expressing topical statements. They identify the focus of the inquiry so that later data, interpretations, and ideas about the resource can be related to this focus. They name or determine the theme, the concept, the topic, the main idea, or the unit that is the focus of their study.

2. Students expressing empirical statements. They use these statements in phase II to identify data they believe is relevant to the concept being studied. They identify or list specific, verifiable data and information recalled from memory or related to what they have heard, read, seen, observed, etc. Statements identifying the where, who, what and when about a resource or situation are common examples of this category of student statement.
3. Students expressing interpretive statements. They express these statements in phase II to identify relationships between the learning resource and data within the resource and the focusing concept of their unit. They reveal the meanings they have assigned to data, an experience, or an idea. These statements take the form of connections, comparisons, relationships, conjectures, opinions, notions, interpretations, estimations, impressions, conclusions, and views.
4. Students expressing statements of definition. They state or determine what a phrase, a word, or a set of terms mean or signify. Statements as to the meaning of a word or concept can be by reference to an accepted source, by context, by examples, by operant criteria, by ideal type or by relevant attributes.

5. Students expressing clarifying statements. They re-word, re-phrase, re-state, elaborate on or expand on statements previously made during the inquiry. These explanations serve to provide clarity for what has already been said.
6. Student expressing criterial statements. They identify the basis, the grounds, the norms, the assumptions, or the criterion they used to frame their relationships and interpretations.

To do an adequate job of stating, clarifying, and justifying the relationships between the concept being studied and the situation that is the object of value clarification, students often use all six of these categories of statements.

During the relational phase, students utilize six categories of statements. They will use the three categories labeled empirical, topical and interpretive conjunctively. Students cite the concept that is at the focus of inquiry using topical statements. They identify and list data and specific information they believe is relevant to the concept being studied in the form of empirical statements. They express connections between these two in the form of interpretive statements. In a similar fashion, students can cite empirical data and knowledge, state the concept that is the topic of their study, and be asked to interpret the data in light of the concept identified. Clarifying statements are used to elaborate on and re-shape ideas

so that all members of the group comprehend what is being said. When students claim a relationship between the concept being studied and factual data and information, they can be asked to identify the basis for claiming the relationship they have expressed as an interpretation. Students, then, employ criterial statements to express the ground on which they base their interpretations and thus demonstrate how the factual data is or can be connected to the topic of study.

If the teacher has reason to believe that words or concepts used by members of the group or contained in the resource to express knowledge, claim relationships or identify grounds for making interpretations are not clear, he can ask students to define the words or the phrase they are using. Where students are unaccustomed to identifying the criteria by which they guide their thoughts, the teacher needs to be sensitive to defining as a category of statement that will help students to pose, verify and understand relationships that can be found between the concept being studied and the situation that is at the focus of value clarification.

In summary, the relational phase (phase II) of the value clarification serves two functions. First and foremost, it enables the teacher to use value clarification activities as an integral part of conceptually designed learning units. By stressing the connections which exist between the resource, the data, the interpretations, and the concept being studied,

the teacher avoids the danger that value clarification will be perceived as an isolated activity not functionally relevant to inquiries into or about science, society and the individual. Secondly, Phase II focuses the attention of students and prepares them for phases III and IV.

Phase III: The Valuation Phase. Phase III of value clarification is designed to get students to examine, reassess, make decisions based on and publicly express their values and feelings. During this phase students are encouraged to react to the resource (or situation) presented; to the concept that serves as the focus of instruction; to the relationships that they have or can establish or are given among the learning resource, the data, and the concept being studied; or to any combination of these possibilities. During phase III, students are encouraged to state their preferences and reveal their feelings and emotions. It is at this point in value clarification that values, feelings and the responsibility to make decisions are made the center of the inquiry for the purpose of helping students clarify their values and better understand their feelings. Since values and feelings can be examined in light of the criteria used to make decisions and assign value ratings, the consideration of alternative policies, the decisions we make, and the possible or expected consequences of our decisions, students engaged in value clarification at this level are expected to use categories of statements related to these kinds of verbal behaviors. These

categories can be specifically identified and named. They are preferenctial, consequential, criterial, imperative, and emotive. During the valuation phase of value clarification, the teacher anticipates hearing:

1. Students expressing statements of preference. They rate or rank objects, events, situations, alternatives, concepts, consequences, men, etc. using such words and phrases as best, worst, good, bad, least good, most good, most bad, right, wrong, most adequate and least adequate.
2. Students expressing consequential statements. They suggest known, expected, or anticipated results or effects of events, decisions, situations, policies, relationships, actions, etc.
3. Students expressing criterial statements. They identify the norms, the assumptions, the grounds, the basis, etc. by which they assign value ratings or make decisions about situations, relationships, policies, behaviors, consequences, etc.
4. Students expressing imperative statements. These are student statements of what ought or ought not to be done, or what should or should not be true, of what must or must not be done, of possible alternatives to consider, or, of what decisions have been made or of what actions a person or groups has decided to pursue.

5. Students expressing emotive statements. These statements by students convey and reveal their personal feelings such as worry, fear, joy, love, happiness, content, excitement, hate, etc.

The valuation phase of value clarification is intended to help students learn to hold preferences, express emotions and support policies in the light of human consequences and criteria with respect for the rights and feelings of others. While any one of the five categories associated with this phase is adequate for inferring that values and feelings are being objectified, value clarification is most reasonably inferred when students make use of a number of these categories configurationally.

During the valuation phase, students employ these categories conjunctively. When students indicate policies that ought to be adopted (imperative statements) and consider the benefits and costs of these policies to man (consequential statements), they use imperative and consequential statements with reference to one another. If students express personal feelings (emotive statements) and decide whether it would be good if other felt as the[illegible] (preferential statements), they use emotive and preferential statements as a pattern of verbal behavior.

It is not unusual for students to state positions involving three or more categories. When students identify policies (imperative statements), select the policy they believe best (preferential statements), and state the basis for their selection

(criterial statements), they express three categories of statements configurationally. When students state feelings (emotive statements), determine the effects of these feelings were others to adopt them (consequential statements), distinguish between desirable and undesirable feelings (preferential statements), identify the basis for their preferences (criterial statements), and develop consistent policies (imperative statements), they employ all five categories configurationally.

The combined use of all these categories during this phase is significant. When a student expresses his preferences the teacher can ask that he identify consequences of his preferences, identify criteria that justify his preferences, frame policies consistent with his preferences, or share his feelings. When a student states a feeling, he can be asked to consider its consequences or to identify alternative ways of behaving open to him because he holds that particular emotion.

At this point, the teacher should be reminded that it is possible for students to publicly announce their preferences and feelings without having examined, re-assessed, or clarified their value system. However, when students have considered their values and feelings after examining the criteria for their ratings and decisions, after considering the consequences of their values, emotions and decisions for man, and after looking at and considering a decision among a number of possible

policies or actions, and after making a decision based upon all these factors, it is then reasonable to infer that students have engaged in value clarification. Subsequently, the degree to which students make use of the five categories of statements associated with this phase greatly influences the quality of phase IV, the reflective phase of value clarification.

Phase IV: The Reflective Phase. Phase IV of value clarification is designed to encourage students to reflect on the values and feelings they have experienced and revealed publicly in response to particular aspects of earlier phases of value clarification. Phase IV enables students to value the preferences and emotions they experienced and objectified in response to a number of particular value sheet episodes all of which related to the same concept. Whereas phases I, II, and III have the form of personal and conceptual value clarification, the reflective phase, by providing the opportunity for more reflective thought and insight, strikes at the more substantial goals of making students aware of how they know, think, and value as human agents.

Phase IV, then, is feasible only after a number of value clarification activities (value sheet episodes) relevant to the same conceptual focus have been made the object of learning, inquiry, analysis, and valuing. By creating a series of situations and resources through which students publicly state their beliefs and disbeliefs over a period of time, this phase

is designed to enable students to examine and, if they wish, to reorganize their belief and disbelief systems. This phase establishes the opportunity for students to examine the consistency and likely consequences of their valuation behaviors. Because several value sheets related to the same concept are necessary in order to make phase IV possible, this series of value clarification activities can most appropriately be referred to as a valuing strategy.

To illustrate the reflective phase of value clarification, suppose that students have studied a minimum of three value sheets relevant to the concept of the "genetic pool". Suppose further that they have comprehended each of the value sheets (phase I), established relationships between each value sheet situation or resource and the focusing concept (phase II), and expressed personal reactions in the form of preferential, consequential, criterial, imperative and emotive statements (phase III). At this point, students can reflect on their performance and generate information, ideas, and values with regard to their own behavior. They can clarify and personalize thier thoughts, values, and feelings related to investigations into and use of the knowledge about topics of study only after a period of guided reflection. In order to secure the advantages inherent in deeper consideration and reflection, the teacher needs to help his students engage in four behaviors. Phase IV of value clarification requires that:

1. Students collect data about how they comprehended and assigned meaning to the data and concept they studied;
2. Students collect and interpret information about how they framed, determined, and used relationships within the context of the concept and resource being studied;
3. Students collect and interpret information about how they made decisions, identified and used norms, considered consequences, conveyed preferences, and expressed feelings; and
4. Students assign personal meaning to how they acquired knowledge, thought, behaved, assigned value ratings and shared feelings using such criteria as personal consistency, social consequences and feasibility.

When students have met the above criteria, they have successfully engaged in all four phases of value clarification.

In summary, value clarification consists of four distinct yet interrelated phases. These phases are: comprehension, relational, valuation and reflective. When three or more value clarification episodes using value sheets have been implemented, Phase IV becomes feasible. When this occurs, the four phases combined are referred to as a value clarification strategy.

Visualizing the Phases of Value Clarification

As he plans and teacher for value clarification, the teacher plans for, observes for, actively solicits, and reinforces student verbal statements relevant to the four phases of value clarification identifed and discussed above. Of the four phases, phases I, II, and III lend themselves to schematic presentation. The three diagrams presented in this section are designed to help the teacher visualize and better understand his instructional role when his object is value analysis and clarification.

Phase I: The Comprehension Phase. This phase is designed to get students to identify, list and share data and information about the situation that has been read, observed, heard, recalled, etc. It helps students review the meaning of the concept that is at the focus of instruction. Teacher questions during this phase serve to help students comprehend the resource being used and to review the meaning of key words and of the concept being studied. The teacher expects to hear students responding with topical, empirical, interpretive, defining and clarifying statements. This phase of value clarification is depicted schematically in diagram 1.

Phase II: The Relational Phase. This phase is designed to have students isolate data and associate it with the concept, topic, or idea being studied. It serves to help students connect the data in a resource to the focusing concept. It serves to

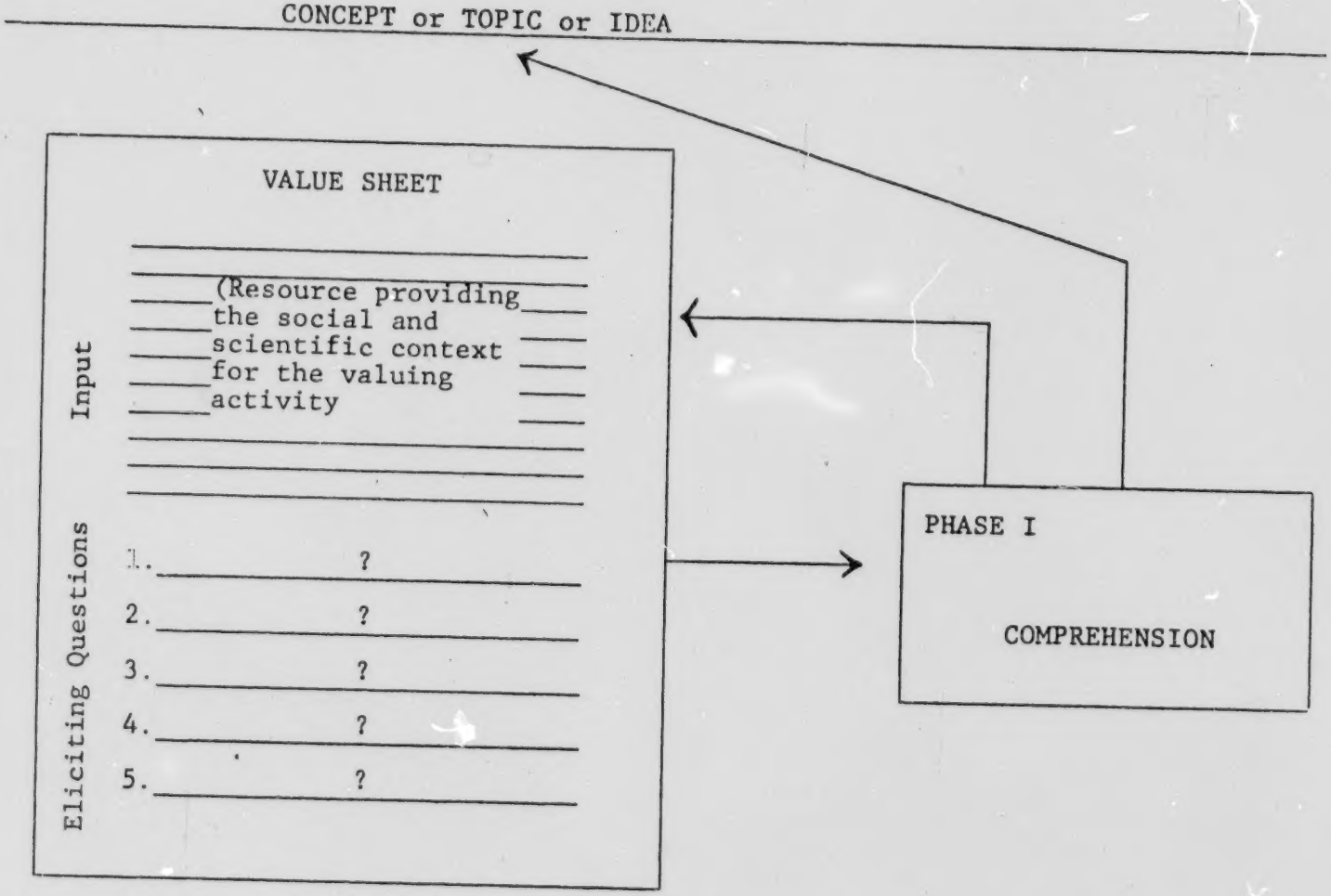
CONCEPT or TOPIC or IDEA
VALUE SHEET
Input
(Resource providing the social and scientific context for the valuing activity
Eliciting Questions
1. ?
2. ?
3. ?
4. ?
5. ?
PHASE I
COMPREHENSION

Diagram 1

identify relationships between the resource material and the concept being explored. By raising questions, the teacher hopes to help his students generate, express, and elaborate connections and relationships. Student statements will take the form of topical, empirical, interpretive, defining, clarifying, and criterial categories of verbal behavior. This phase is depicted in diagram 2.

Phase III: The Valuation Phase. This phase is designed to get students to express their preferences and feelings toward data, a situation, relationships, possible decisions, etc. When this phase is used, students consider and publicly state consequences, norms and grounds, alternatives available, and decisions. During this phase, the teacher uses questions to help students objectify their values and feelings. The teacher expects to hear his students expressing preferential, consequential, criterial, imperative and emotive statements in response to his questions. This phase of value clarification is depicted schematically in diagram 3.

Besides visualizing the first three phases of value clarification, the section above alluded to the role of teacher questions in each phase of value clarification. The narrative suggested that questions help the teacher solicit certain specific categories of statements from his students. The classroom teacher can use questions in two ways: first, to plan and develop questions that are appropriate for each of the separate

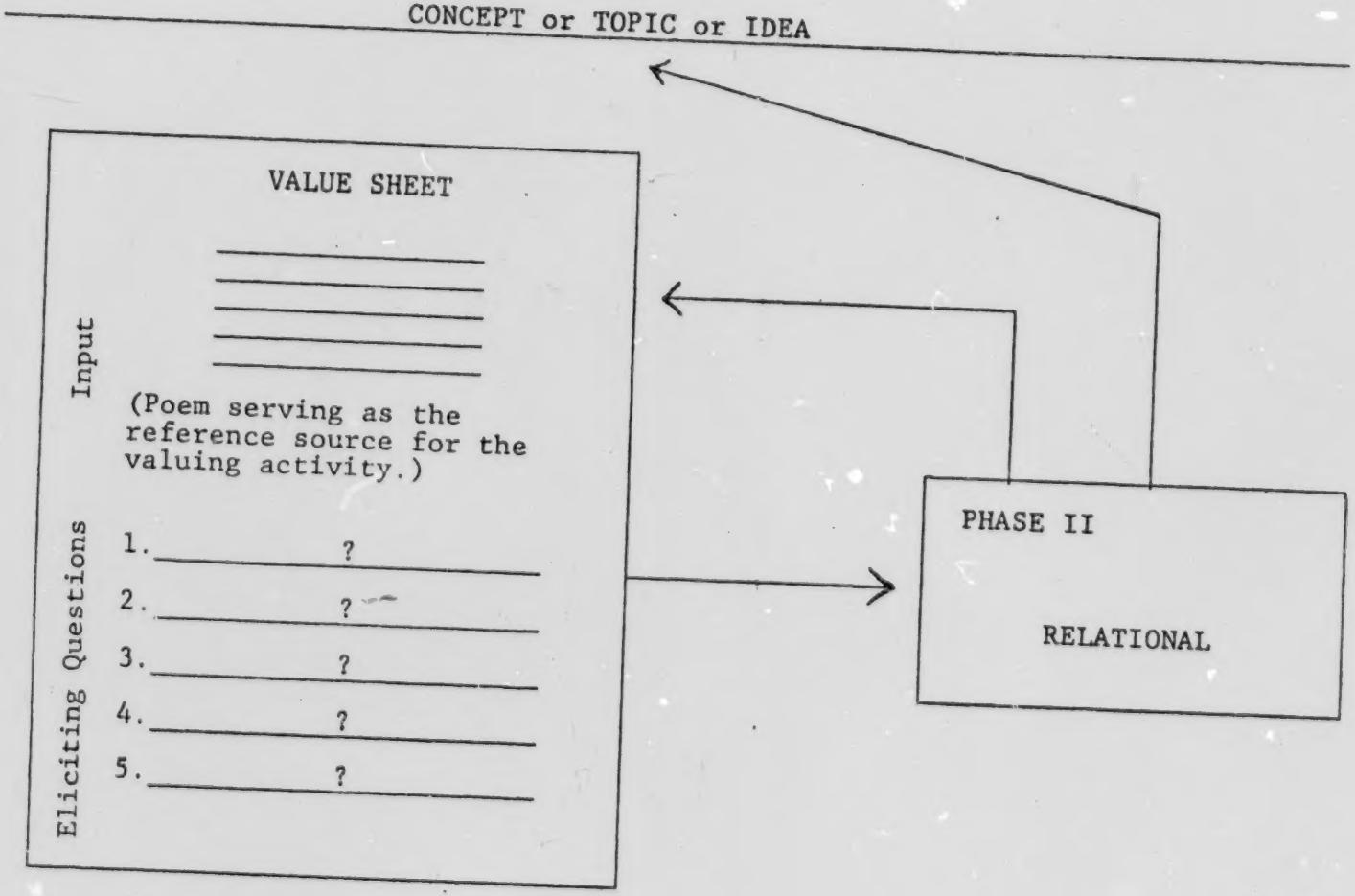
CONCEPT or TOPIC or IDEA
VALUE SHEET
Input
(Poem serving as the reference source for the valuing activity.)
Eliciting Questions
1. ? 2. ? 3. ? 4. ? 5. ?
PHASE II
RELATIONAL

Diagram 2

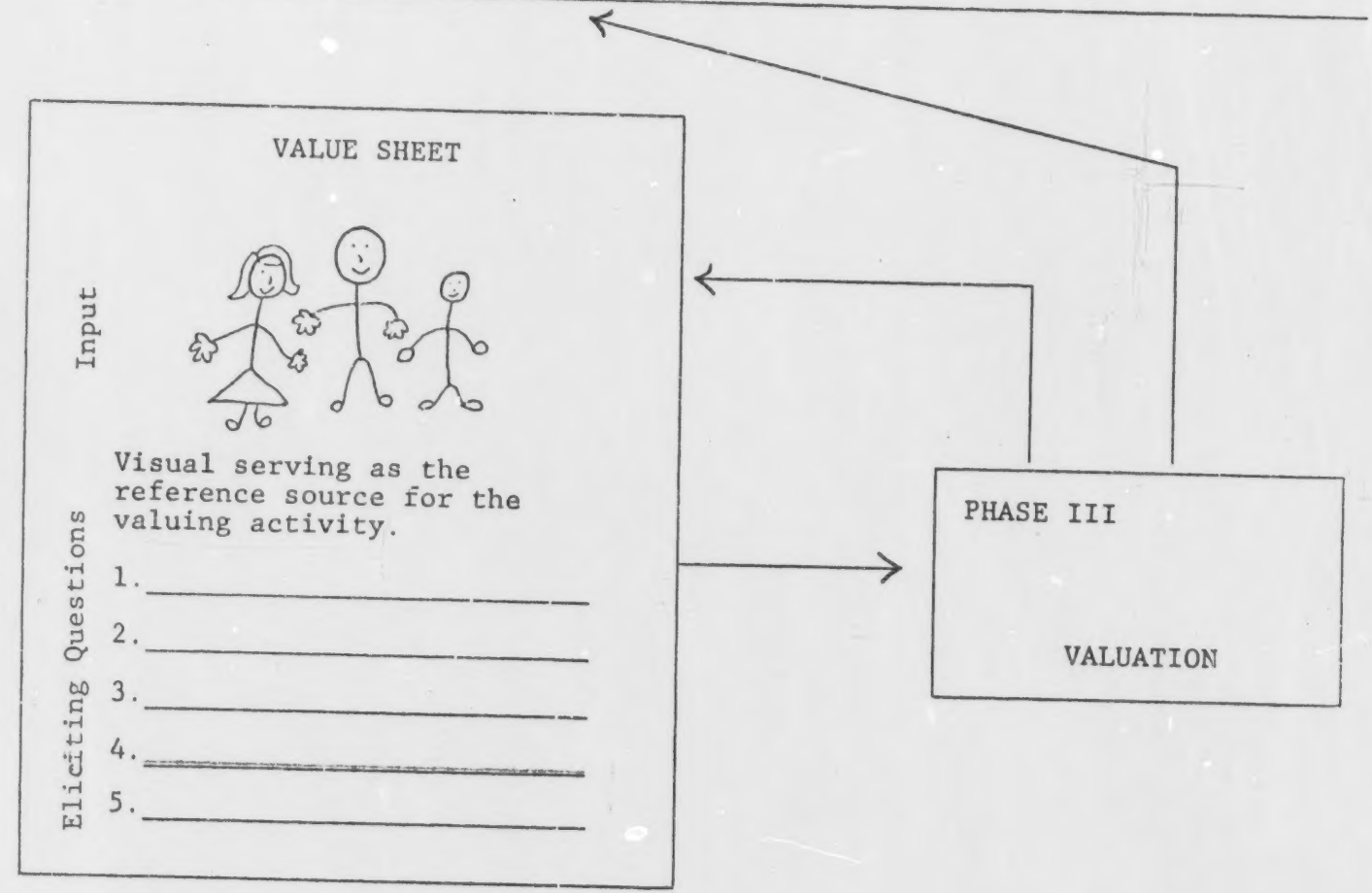
CONCEPT or TOPIC or IDEA
VALUE SHEET
Input
Visual serving as the reference source for the valuing activity.
Eliciting Questions
1.
2.
3.
4.
5.
PHASE III
VALUATION

Diagram 3

phases of value clarification so that his students can organize the data and their thoughts around the resource being used and the concept being studied: and second, to enable the teacher to respond spontaneously and flexibly to student behaviors that occur during the course of a guided inquiry. Because different kinds of questions are used to solicit different kinds of student responses, the teacher has, in reality, several modes of questioning or interrogative behaviors at his disposal.

One effect of using different interrogative modes is that students and teacher are encouraged to move between the various phases of value clarification in considering different aspects of the relationship between science and society. A second effect of employing different modes of questions in guiding value clarification discussions is that it encourages the interphasic use of student language patterns. The advantage of employing these questions in this manner is that students are more likely to express their ideas, share their values and feelings, and refer to pertinent data with spontaneity. Without this degree of openness and flexibility, students are unlikely to feel secure or to perceive the interplay of knowing, thinking, and valuing as complementary elements useful for clarifying relationships found between science and society. Four modes of interrrogative behavior will assist the teacher to become interphasic.

Four Interrogative Modes of Teacher Behavior

The teacher who wishes to help students respond during value clarification activities and to value sheet as mentioned earlier will find four modes of questioning useful and applicable. These modes of interrogative behavior enable the teacher to focus and guide student attention during class discussion. The four modes of questions are: 1) empiric, 2) relational, 3) value, and 4) feeling.[3]

The Empiric Mode of Questioning. Empiric questions are employed when the teacher wishes to elicit statements of fact from students and to help them establish a pool of related data about a situation that is to be the object of valuation and value clarification. Some common examples of empirical questions are:

. . . What did you observe?

. . . What did you hear?

. . . What did the speaker say?

. . . What does your book say?

. . . What year was this gadget invented?

. . . Who first discovered this element?

. . . When did Salk make his discovery?

. . . Can you name the three elements in this compound?

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[3]These four phases were originally defined as an inservice education component for elementary social studies teachers. Support was provided by the Tri-University Project in Elementary Education-Social Science, University of Washington. J. Doyle Casteel. Verbal Strategies of Valuing, 1969. (21 ditto pages)

The teacher can use eliciting questions such as these in conjunction with a wide variety of learning resources and activities in order to help students identify and assemble data relevant to the situation they are expected to comprehend, interpret, and assign value. While often times considered irrelevant, inappropriate or unimportant in value clarification-oriented activities, this mode of quesitoning (and in particular, student responses to these questions) can play a vital role by assuring the teacher that the inquiry statements of his students are based upon accurate information rather than baseless, inaccurate or ill-founded personal opinions and notions.

The Relational Mode of Questioning. Relational questions are used when the teacher wants students to discriminate between factual data and information that is germane to the focusing concept being studied and that which is not. These questions help students connect the data gathered and the resource material with the concept or topic being studied. Relational questions are also used when the teacher wants students to compare alternative ideas, policies or ways of behaving. Relational questions are vital to the relational phase (phase III) of value clarification. Some common examples of relational questions are:

. . . How is what you read related to our topic of study?

. . . In what ways are these ideas related?

. . . In what ways is this information pertinent to our concept?

. . . What results of the experiment are most germane to the unit we are now studying?

. . . How would you compare the decision made by the group with your own decision?

. . . Are these two theories related to one another?

. . . How do the consequences of the third policy differ from those we listed for the first two policies?

The teacher can use similar questions to elicit responses which help students explore the relationships between different elements found in a situation or resource to be valued. Relational questions are used to solicit student statements as to the connection that exists between different kinds of statements that have been expressed during class or small group discussion. If a teacher has planned, developed and employed a value sheet in the classroom for the purpose of assisting students clarify their values and if a teacher expects students to consider their value preferences in relationship to the concept being studied by the class, the teacher will make an effort to help students comprehend and understand the relationship between the value sheet and the concept being studied. Relational questions assist the teacher in guiding students to this end.

The Value Mode of Questioning. Value questions are employed when the teacher wishes to get students to publicly state and affirm value ratings they have assigned. These questions both focus the attention of students on certain aspects of the situation they are asked to rate and guarantee that students affirm

their value assignments. One might see value questions as assisting the teacher to focus on eliciting assigned value ratings and preferences with regards to situations, resources, and behaviors from his students. Common examples of value questions are listed below:

. . . Is it good or bad for mankind that we continue to use scientific knowledge in this way?

. . . Which of the consequences listed do you find most desirable?

. . . If all men felt as you feel, would this be good? for whom?

. . . Which of these policies would be the best one for us to follow?

. . . Is it wrong for mankind to pursue research in this area?

. . . Of the alternatives listed, which would be most harmful to man?

. . . Is it right for man to engage in activities such as these?

Value questions are used by the teacher to encourage students to determine, objectify, and publicly affirm their preferences. Value questions can be used to help students examine and reassess their value ratings with regard to such categories of statements as facts, relationships, consequences, interpretations, policies and decisions. Since the entire purpose of value clarification-oriented activities is to have students

examine, explore and consider their values, the teacher must incorporate this mode of questioning into the inquiry.

The Feeling Mode of Questioning. Feeling questions are utilized when the teacher wishes to solicit emotive statements from students. These questions provide the teacher with a mode of behavior designed to grant acceptance and awareness of the human element of emotions as an acceptable behavior in the classroom and in any social group. When the teacher succeeds in eliciting emotive statements through the use of feeling questions, he provides his students with the opportunity to examine, reveal and study human emotions as they relate to science, society and man. The teacher in doing this also helps other members of the class to comprehent better the choices and actions of their classmates during value clarification episodes. Some common examples of feeling questions are:

. . . How do you feel about the decision we have just made as a group?

. . . When you consider the facts, are your feelings the same?

. . . When you heard that scientists had decided to perform the experiment, what were your emotional reactions?

. . . Empathizing with the man in this story, how do you feel about his situation?

. . . When you first realized the nature of this relationship, what were your feelings?

. . . If this policy were to become law, how would you feel?

Since feelings are essential to human beings and since the feelings of participants during an inquiry are quite likely to influence their behavior, the recognition of, and legitimization of these feelings are not elements to be avoided or ignored. Feeling questions enable the teacher to objectify student feelings and open these dimensions of student behavior to rational inquiry.

The teacher who wishes to engage his students in value clarification activities by developing and implementing alternative formats of the value sheets in order to help his students express statements associated with value clarification will find the four modes of interrogative teacher behavior relevant to his purpose and needs. The brief descriptions presented above are summarized and extended in the table below.

The Value Sheet

Value sheets can be planned to stimulate student value clarification. Examples of six different formats in which value sheets may be written and used are presented in this section. These formats are:

The standard format

The forced-choice format

The affirmative format

The rank-order format

The classification format

The criterion format

FOUR INTERROGATIVE MODES RELEVANT TO VALUE CLARIFICATION

Some concepts, topics, and ideas related to genetics

(a) genetic loading
(b) cloning
(c) genetic engineering
(d) eugenics
(e) _____ (concept, topic or idea of your choice)

EMPIRIC	RELATIONAL	VALUE	FEELING
What did you see?	How does what you saw relate to the topic? Explain your answer.	Is the relationship you see good or bad for man? Explain.	How do you feel about what you saw? read? experienced? remember?
What did you hear?	How does what you heard relate to the topic? On what grounds?	Is the event you experienced good or bad for man? Please elaborate.	How do you feel about the relations established?
What did you read?	How does what you read relate to the topic?	Are the consequences of the relationship you established between facts and topic good or bad for man? Provide some illustrations.	How do you feel about the effort to base values on the concepts of human utility?
What did you observe?	How does what you observed relate to the topic? On what basis?	Would it be good or bad for man if we agreed with the feeling you just expressed?	If you found yourself in the situation we have described, what would be your most immediate feelings?
What did you experience?	When you identified anxiety as a good consequence, how were you relating it to our topic?	Imagine a situation in which everyone pursued your policy. How would you judge the situation?	
What do you remember?			
What happened?			
Suppose you wanted to empathize with the mother who is confronted by the question presented here. What information would you have to work with?			

The Standard Format

The standard format contains a learning resource and a set of eliciting questions. It can be presented through different mediums (such as a reading, a cartoon, a picture, or an experiment). It is selected in terms of its relevance to the concept students are studying. Eliciting questions are designed to help students comprehend the resource, connect the resource to the concept being studied, and stimulate students to state and affirm values and feelings (see diagram 4). The following are examples of the standard format of the value sheet.

CLONING

Preparation

1. Secure a copy of the abridged Time magazine article for each student.
2. Encourage students to develop written responses to each of the questions.
3. Be prepared to list a number of other applications of genetic knowledge to set the stage for other value clarification activities.

The Article[4]

Man may eventually be able to abandon sexual reproduction entirely. That startling and perhaps unwelcome possibility has been demonstrated by Dr. J. B. Gurdon of Britain's Oxford

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[4]"Man Into Superman: The Promise and Peril of the New Genetics"; Time, April 19, 1971, pages 33-38, 43-52. (Also see: "We have the awful knowledge to make exact copies of human beings"; New York Times Magazine, Willard Gaylin, March 5, 1972, page 12, 41-49.)

University. Taking an unfertilized egg cell from an African clawed frog, Gurdon destroyed its nucleus by ultra-violet radiation, replacing it with the nucleus of an intestinal cell from a tadpole of the same species. The egg, discovering that it had a full set of chromosomes, instead of the half set found in unfertilized eggs, responded by beginning to divide as if it had been normally fertilized. The result was a tadpole that was the genetic twin of the tadpole that provided the nucleus. Gurdon's experiment was also proof of what geneticists have long known: that all of the gentic information necessary to produce an organism is coded into the nucleus of every cell in that organism.

Man, say the scientists, could one day clone (from the Greek word for throng), or asexually reproduce himself in the same way, creating thousands of virtually identical twins from a test tube full of cells carried through gestation by donor mothers or hatched in an artificial womb. Thus, the future could offer such phenomena as a police force cloned form the cells of J. Edgar Hoover, an invincible basketball team cloned from Lew Alcindor, or perhaps the colonization of the moon by astronauts cloned from a genetically sound speciman chosed by NASA officials. Using the same technique, a woman could even have a child cloned from one of her own cells. The child would inherit all its mother's characteristics including, of course, her sex.

Dramatic as cloning may be, it is overshadowed in significance by a technique that may well be practiced before the end of this century: genetic surgery, or correction of man's inherited imperfections at the level of the genes themselves. When molecular biologists learn to mapy the location of specific genes in human DNA strands, determine the genetic code of each and then create synthetic genes in the test tube, they will have the ability to perform genetic surgery.

Follow-up Questions

1. How does the article define the term clone?
2. How does the cloning differ from normal reproduction?
3. In what way is cloning related to human engineering? to eugenics?
4. How might society use cloning to its benefit? to its detriment?

5. How might cloning increase public support for genetic research?

6. How might cloning cost scientists who are interested in obtaining public funds to continue their research?

7. If you could have any five people duplicated by the cloning technique, who would those five persons be? Explain the reasons for your choices.

8. Would you like to see a duplicate of yourself? For whom would that be good?

9. If the technique of cloning were perfected in the near future, for whom would it be good? bad?

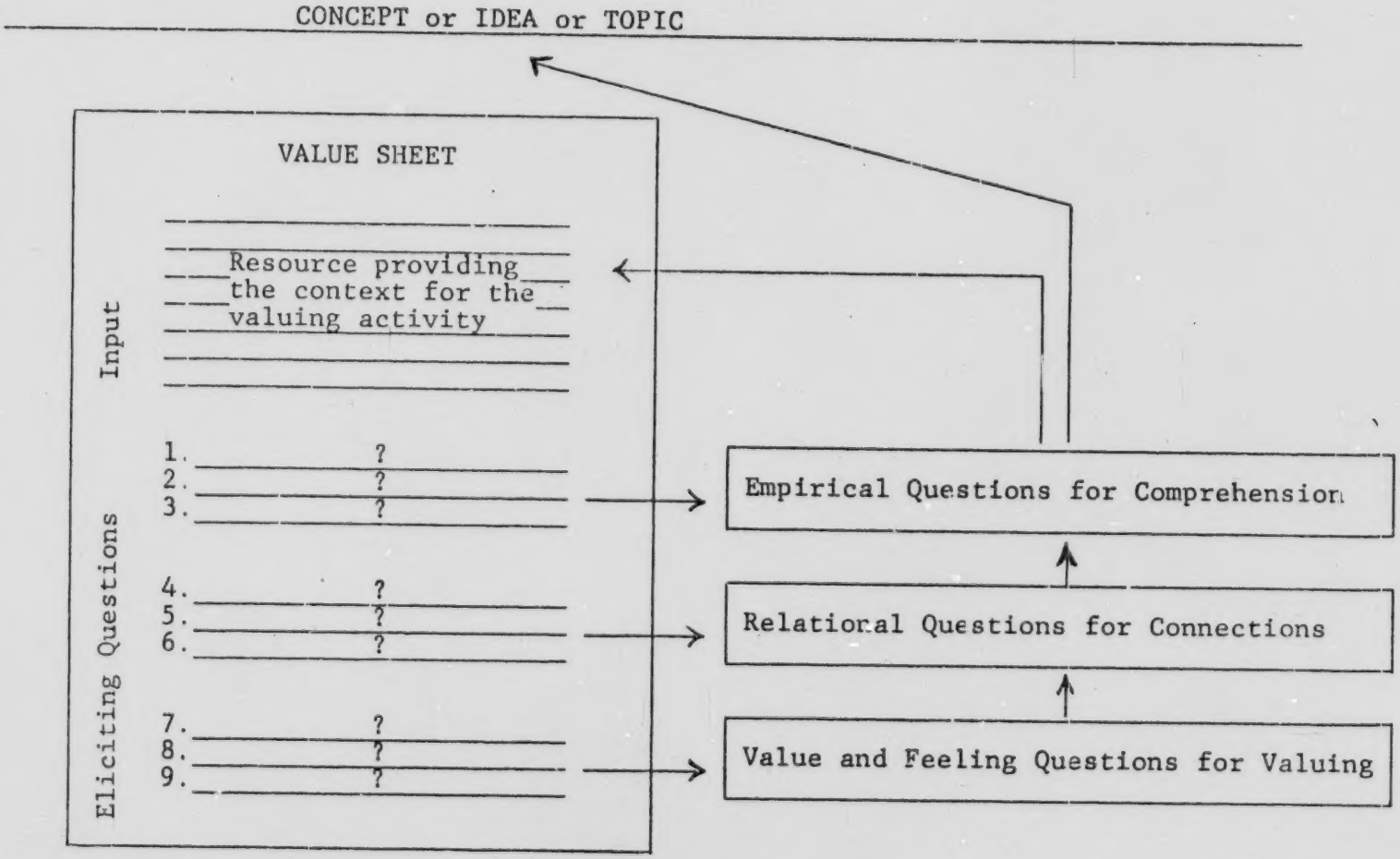

Diagram Depicting the Structure of

the Standard Format of the Value Sheet

Diagram 4

PEOPLE, TUBES AND THINGS

Preparation

1. Secure a copy of the test tube drawing for each student.
2. Encourage students to develop written responses to each of the questions.
3. Determine which of the questions following the drawing you wish to have your students answer.
4. Be prepared to list a number of the possible applications of genetic knowledge and some likely consequences of that utilization.

The Material

"The New Thing"

Test Tube

Follow-up Questions

1. What does the test tube symbolize?
2. What does the baby symbolize?
3. What does the title "The New Thing" refer to?
4. The test tube fetus is a symbolic way man communicates his thoughts, preferences, feelings, and desires. What does the test tube communicate to you?
5. According to this symbolic expression, how does science affect you? How might your reactions affect scientific inquiry?
6. To what degree can a human being be produced in a test tube? To what degree <u>should</u> a human being be produced in a test tube?

7. Would you consider individuals created in test tube environments to be human? Explain.

8. Who would be this individual's "mother"?

9. Scientific knowledge can be compared to Pandora's Box. What desirable social and scientific consequences might follow the scientific capability of creating life in a test tube? What undesirable consequences might science as a community of knowledge and man as a member of society face for developing this capability?

10. Imagine you discovered that you had been a test tube baby. What would your feelings be?

11. Does man have the "right" to tamper with his hereditary material? If so, who gave him the "right"?

The standard format of the value sheet often requires only fifteen to twenty minutes of an instructional period. It provides students with a means of becoming accustomed to expressing and sharing values and feelings.

The Forced-Choice Format

The forced-choice format always contain at least three elements. First, the students is presented with a problematic situation. Second, the student is given a limited number of questions from which he must select the one best possible choice. Having selected the best, the student is asked to identify the criterion (grounds or basis) he used in order to make his choice. The problematic situation presented to the student can either be contrived or taken from an actual occurrence. The number of options open to the student from which he must choose should not

be an extensive listing and should not contain a neutral or "easy way out". Ideally, these options should all be good or all be bad. The student's response should also examine the possible consequences of his particular choice as well as the consequences that could be expected for not having taken one or all of the other choices.

A SMALL SEARCH FOR ELUSIVE REASONS

Preparation

1. Help students review or develop an understanding of genetic analysis.
2. Secure sufficient copies of the value sheet for each class member to have a copy.
3. Divide members of the class into discussion groups of four to seven members each allowing students to select their own groups.
4. Provide instructions to the effect that each group is to make a decision and find reasons that will justify the decision they made.
5. Explain that there are no right or wrong decisions; that any decision they make and can provide grounds for is most appropriate.
6. Secure one page of newsprint and one felt pen for each group to assist them in sharing their decisions and criteria with one another (optional).

The Social and Scientific Concept[5]

A mongoloid child was born with a defective digestive tract which was sure to cause death by starvation if not corrected. Correction involved a relatively simple operation. The child's

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[5]After "Keeping Patients Alive: Who Decides?" U.S. News and World Report, LXXII, 21, May 22, 1972, p. 47

mother refused to permit the operation becuase she felt she could not give adequate care or love to the defective infant and her three normal children. She also pled that for the mongoloid child to live would cause great harm to her three normal children. Faced with this refusal, the doctors recognized four possible courses of action:

. . . They could ignore the mother and operate anyway.

. . . They could consent to the mother's desire and allow the baby to starve to death.

. . . They could inject an air bubble into the baby's bloodstream, killing the mongoloid child painlessly and quickly.

. . . They could seek a court order to perform the operation as a legal right of the child.

Given only these four choices, the doctors should have:

_____

_____

_____

Of the four choices, this is best because:_____

_____

_____

_____

_____

_____

Discussion Starters for Maintaining Focus

1. What causes mongolism?

2. How did you feel while deciding the fate of this baby? How do you think the doctors felt?

3. Realizing the consequences of giving birth to a mongoloid child, is society wrong by not requiring genetic analysis and counseling of all parents to avoid the conception of mongoloid children in the future?

4. It is conceivable that genetic scientists could persuade society to use genetic knowledge. What obligations to society do these scientists, as scientists, have to engage in persuasion?

5. Is it "right" for a society to possess useful scientific knowledge and not use it? Explain your response.

6. Who should decide when it is the "right" time to use genetic knowledge?

7. How would you feel if you were informed by a doctor that you possessed defective genes capable of producing a mongoloid child? If you choose to ignore his advice not to conceive a child, what excuse would you use to explain your actions?

The forced-choice format can be used to force students to differentiate between a number of options toward which they feel positive or from a number of choices toward which they feel negative. This enables students to experience situations where the problem is one of choosing the greater good or the lesser evil. This format also encourages students to become aware of the norms that influence and guide their behaviors through its emphasis on having students state the criterion they used in making their selection.

The Affirmative Format

The affirmative format presents the student with a concrete situation involving an individual or group that has a difficult decision to make. The student's role is to comprehend the situation, to use his understanding in order to project what his thoughts and feelings would be were he himself the person

the person described, and to state and affirm publicly the decision he would make.

PROFESSIONAL DESIRE VERSUS PERSONAL WILL

Preparation

1. Secure sufficient copies of the situation for each student; or, ask a person who reads well to help you develop an audio cassette to play.

2. Read a description of Huntington's Chorea to your students that describes the disease as to cause, stages, and effects; or, select a reading that contains information about Huntington's Chorea.

3. Decide whether you will have students to share their personal letters with one another in small groups or as part of a total class discussion.

4. Determine if you are willing to spend more than one to two days focusing on this value sheet. If you do, consider a) distributing and discussing a table of inherited diseases including their causes, description, and effects; b) have different groups of students role-play the reaction of Richard's wife and his father's two friends to the different decisions affirmed by Richard.

The Social and Scientific Context

Dr. Richard Layne has been and remains a compassionate man ambitious to provide his fellowman with the social benefits of new medical knowledge. As a high school biology student he became aware of and developed an intense interest in the field of inherited diseases. With further undergraduate work and medical training his interest deepened and he became more sensitive to the pain and suffering some individuals are doomed at birth to bear. Having completed his medical training, Dr. Layne chose to pursue further studies in order to become a specialist and researcher in the area of inherited diseases.

Once Dr. Layne had entered practice, he quickly established a reputation as an able doctor and a brilliant organizer. Soon, he found it possible to obtain private and foundation support

for a clinic. Although he applied for public grant monies, these applications were continually rejected because his clinic focused on the application of medical knowledge and failed to develop a research component. Unable to obtain public monies to augment private and foundation gifts and faced with inflationary costs of operating, funds were continually marginal. The Clinic lived a precarious existence because of inadequate operating monies.

To support his Clinic, Dr. Layne found himself spending more and more of his time speaking to private groups and organizations. Eventually, his speeches took on a pattern in which he stressed three themes.

The first theme the doctor developed was that his Clinic had a social mission to perform. This mission, he explained, was to analyze the genes of prospective parents and to determine if prospective parents possessed genetic traits likely to affect their offspring adversely. Once the Clinic had determined that potentially dangerous traits were present, he continued, the Clinic offered counseling services. During counseling, prospective parents were informed of the risks involved should a child be born and urged to consider alternatives. When parents were willing or succumbed to this urging, the alternatives available to parents found to possess genetic traits likely to produce diseased children were clearly spelled out and explored with prospective parents. During this phase, Dr. Layne in effect outlined the work of his Clinic for the layman whose support he sought.

The second theme presented by the doctor detailed the potential pain, suffering, and deformity that could be attributed to parents who chose to have children in spite of accurate genetic analysis and prognostication. At this point Dr. Layne operated as a zealot and sought to justify the direct nature with which his counselors urged parents to consider alternatives to conceiving children where there were strong probablities of inherited disease. "Any person who knowingly and willingly gives birth to children and risks condemning them to suffering a hereditary disease or deformity ought to be condemned and sentenced to spend an eternity in the hottest fires of hell." During this part of his speech Dr. Layne sought to proselytize the citizens to whom he spoke and win monetary pledges with which to continue his work.

Dr. Layne's third theme dwelt on the dire needs of the Clinic. Dr. Layne outlined his difficulty in obtaining and keeping the services of a qualified staff. He described equipment and facilities that would increase the scope and social benefit of his Clinic. He confessed that current circumstance had created a situation in which his Clinic was barely surviving on a day-to-day basis and that its sudden demise at any moment should not be surprising. Donations procured by this means trickled in at a rate necessary to keep the Clinic in existence. But just barely.

Although he never referred to the matter publicly, Dr. Layne was particularly frustrated by the fact that his retired and reclusive father was quite a wealthy man. Moreover, his father frequently donated large sums in excess of $10,000 to charitable causes and was considered a humanitarian. And shortly before Richard had graduated from medical school, his father had founded the Layne Foundation and funded it with a three million dollar endowment to be used to ease human suffering and improve the quality of American life. His father, however, refused to donate money to the Layne Clinic and instructed the officers of the Layne Foundation that all requests from the Layne Clinic, regardless of merit, were to be refused.

Before he became almost hermit-like in his life style, Dr. Layne's father made remarks about the Layne Clinic. He referred to the Clinic as "that thing of Richard's". He periodically hinted that the Clinic was evil. He suggested that the Clinic's chief effect was to cause men and women to hate and distrust one another because of a distrust fed by fears that their mates might not possess desirable genes. But Dr. Layne's father limited his comments to remarks; he consistently refused to elaborate or explore his meaning with his son.

When Dr. Layne married one of the nurses who worked at the Clinic, Anne, he and his wife determined that they would not have children of their own until such time that the Clinic was more adequately funded. This they felt would enable both to continue working and relieve some of the financial strain under which the Clinic operated. They did not discuss their decision with Richard's fater h because he had been away for five years and rejected a wedding invitation. Furthermore, he requested that Richard and his new bride live their own life and allow him to do the same. He wished them good luch, sent his blessings, but made it clear that he would not welcome the company of Richard and his wife.

Three years passed and the Clinic clung to a precarious existence. For eight years Richard had not seen his father. For three years, almost, Richard had neither spoken with his father directly or received a letter from his father. Then one night he was awakened by his father's lawyer and informed that his father had died in a flaming plane crash. Because bodies were charred, the coffin of Richard's father was not opened during the burial service.

Only four people attended the burial service: George Kirkpatrick, Mr. Layne's confidential advisor, personal friend, and chairman of the board of the Layne Foundation; John Herman, family friend and chief legal advisor to Mr. Layne and the Foundation; Richard; and his wife, Anne. Following the funeral these four people returned to Richard's home where John Herman read Mr. Layne's will and handed Richard a letter from his father.

Assignment

For purposes of your assignment, you need not be concerned with the details of the will other than to know that George Kirkpatrick and John Herman were personally loyal to Mr. Layne and legally responsible to carry out his last will and testament. The letter from Mr. Layne to Richard presents you with your problem. The letter read:

Dear Richard:

Little did you know that I am one of those you have publicly and often chose to "condemn to hell and eternal fire". You see, Richard, I am the victim of a hereditary disease, Huntington's Chorea, and my life as a recluse these past few years had been my punishment. You are doomed to the same future. There is no cure. I could not tell you this while I lived for reasons that I hope you will understand and appreciate.

One thing you must understand is my strong sense of family obligation. I am vitally concerned that you have a son to continue the line of Layne's. The Layne family line has existed for countless centuries. It has enjoyed a rich and colorful history. The family has contributed much, as you have, to the improvement of man's life on this earth. To the degree that I can exercise power from beyond the grave, I will not have the Layne tradition end with you. I am bound by my forefathers and by my own sense of duty to do everything to preserve the Layne family line.

Therefore, I have done what I had to do.

I have instructed my lawyer, John Herman, and the chairman of the Layne Foundation, George Kirkpatrick, that they are to carry on the work of the Layne Foundation. As you no doubt know, the Layne Foundation now has a new endowment in excess of $3,000,000. All my stock is to be sold (estimated value of $15,000,000) and added to the current endowment of the Foundation at my death. Legal arrangements for this have been carefully arranged. For five years John and George are to continue the current program of the Foundation. At the end of five years from the date of my death, they are to exercise one of two options:

If you should conceive a son who reaches the age of thirty months, they are to turn the Foundation over to you with its entire endowment to use as you see fit.

If no son is born or attains the age of thirty months within the five year period of time, the energies of the Foundation are to be redirected to fight the existence of clinics such as yours. The rationale for this behavior will be to save others the anguish that I have suffered because I knew that I carried and transmitted the disease in my genetic structure.

Your decision is yours. I hope that you find it easier to wrestle with your conscience than I have found it to wrestle with mine. Regardless of your final decision, I have loved you deeply and am proud of the way you have maintained the family tradition.

Love,

Dad

Both Richard and his wife were shocked and dismayed by the letter. Richard discussed his situation with John Herman who told him that he believed Mr. Layne's will could not be broken. Richard discussed the matter with George Kirkpatrick who tried to help Richard understand his father's ambition to maintain the family line. Richard discussed the matter with his wife full of remorse that they had neglected to submit to genetic analysis prior to marriage. Following this long and often emotional discussion, Richard indicated that he would inform George and John of his decision by letter within the week. George and John left.

Unable to sleep with the weight of an unmade decision that evening, Richard decided to make his decision once and for all immediately. In his opinion, he made the best, the only, and

the ethically correct decision demanded of his as a son, doctor, administrator, humanitarian, and husband. He then drafted a letter to John Herman, his father's lawyer. In the letter he stated what his decision was and explained his reasons for having arrived at his decision. That decision was . . . .

(Now it's your turn. Write the letter to John Herman that Richard wrote.)

Discussion Starters

1. If you had been Richard's wife, Anne, how would you have helped him to make his decision?
2. If you have been either George or John, how could you have justified destroying the will?
3. Would you refer to Mr. Layne as a moral or immoral man? Explain your answer.
4. Can Richard make a scientific decision that is not anti-humanitarian? Explain your response.
5. Can Richard make a humanitarian decision that is not anti-scientific? Explain your response.
6. Should will such as Mr. Layne's be upheld in courts? Explain your answer.

The affirmative format of the value sheet stresses empathetic understanding and the situational component of making decisions and determining personal preferences. In contrast with previous formats, the affirmative format focuses on personal and social decisions as invented constructs by which reality can be probed

and to some degree controlled. It helps depict the problematic nature of human life because individuals are often placed in situations in which they must make hard decisions.

The Rank-Order Format

The rank-order format of the value sheet contains a focusing situation that is problematic. It also contains a number of choices that are to be assigned ratings according to an order of personal preferences. The emphasis of this format is on the entire hierarchy of our preferences rather than just on our first choice. Whereas the rank-order format typically contains only one rank-order activity, the example provided below incorporated three such tasks. This example is intended to illustrate the rank-order format as well as to demonstrate the divergent ways in which rank-order activities can be built and used.

GETTING "THE LOAD" OFF YOUR MIND

Preparation

1. Identified in this activity are these distince sections:

   a. the social and scientific context: the news releases;
   b. rank-order exercise one related to the news releases;
   c. the social and scientific context: the television broadcast;
   d. rank-order exercise two related to the television broadcast;
   e. the social and scientific context: the political scene; and
   f. rank-order exercise three related to the national referendum.

2. For purposes of this exercise, the social and scientific situation to which you will ask students to respond is contrived. There is, however, a growing body of literature suggesting that the circumstances contrived here, while fictional, are not fantasy. You may wish to point out to students that the organizations, individuals and events in this situation are invented.

3. Determine how many of the rank-order tasks you will ask students to engage in. The third rank-order exercise identified as the national referendum is the focal point of this activity and is to be completed.

4. Secure copies of the value sheet for each student. If you intend for students to complete all three rank-order exercises, you may wish to distribute only one component at a time. (A component is a social and scientific context situation with its adjoining rank-order exercise.)

5. Decide whether you are going to discuss each rank-order exercise after the students have completed them or whether you will discuss all three at the same time following the completion of all rank-order exercises.

6. Identify vocabulary words likely to cause difficulty for your students and develop a glossary (on ditto or on the board).

7. Decide how many days you will devote to this activity. You may wish to spend some time developing background understandings using articles and concepts previously studied in class or listed under the heading of genetics in this bibliography of the AAAS.

8. Decide whether you want students to rank-order the "national referendum" exercise individually or as a member of a group seeking consensus. If you decide to make it an individual matter, consider having students vote anonymously (using secret ballots) and using a committee to compile and report results prior to or following follow-up discussion of the value sheet.

9. Consider varying the presentation by allowing two panels of students to present and elaborate on the conclusions and recommendations of the television broadcast by the panel of scholars much like news commentators and analyzers follow other national broadcasts.

Social and Scientific Context: The New Releases

The following news items have appeared in the daily newspapers that are typically read in all sections of the nation and have been the subject of radio and television news programs and newscasts. All have come to your attention within the last twelve months.

News Release Number 1

The National Health Commission (NHC) issued a bulletin reporting that the significant increase in persons born with mental or physical defects is alarming. The bulletin, as issued, contained data showing substantial increases within the last fifty years in the incidence of diseases that can either be associated with or are known to be transmitted by hereditary means. Of these cases of inherited diseases and disabilities, the most common are hemophilia, Huntington's Chorea, and other genetic-related diseases.

News Release Number 2

At a noon time news conference, the National Commissioner of the Federal Law Enforcement Agency (FLEA) summarized a report compiled over a two-year period by the Presidential Commission on Criminal Behavior. According to the Commissioner, the nation must now accept and confront the facts about crime.

"Fact number 1, for a number of decades the number of serious crimes committed against persons has exhibited a dramatic tendency to increase. After dark, the major cities of America are jungles which fewer and fewer citizens are willing to enter unarmed.

Fact number 2, the Presidential Commission has identified and described certain categories of persons to whom the spiraling growth of crimes committed against persons can be attributed. Quite often, the potential criminal can be identified: however law enforcement officers cannot act until they have evidence that a crime has been planned, attempted, or committed. And for the victim this is often too late.

Fact number 3, a number of the categories of persons likely to commit serious crimes are born in families whose family trees (history?) are filled with criminals.

Fact number 4, as the population increases, law enforcement officers must realistically expect the current rate of serious crimes against persons to continue so, and perhaps increase slightly."

According to the Commissioner he is limiting himself at this time to a presentation of the factual conclusions that can be derived from the work of the Commission. Asked if he anticipated any controversy when the recommendations of the Commission are published (in about three months, according to one knowledgeable source), the Commissioner acknowledged that this might be the case but did not consider it appropriate to comment further until the President has had time to analyze and evaluate policy implications of conclusions reported by the Commission.

News Release Number 3

In a brief statement distributed to reporters without comment today, the National Commission on Education Measurement (NCEM) reported findings based on the administration of an intelligence test measure to a sample of elementary and secondary students. According to the statement issued, an analysis of test results indicates that the number of children with scores characteristic of mentally defective children has exceeded percentages by approximately four percent (3.87%).

The statement, handed to reporters by the national Director of Testing who refused to answer questions, stated that efforts to correlate these findings with environmental factors had not been fruitful. The statement concludes with the unelaborated comment that "some other factor, possibly heredity, could explain the results of the survey".

News Release Number 4

The Board of Directors of the National Association for Mental Health has announced a major change in its policy for awarding research grants to scholars and research institutes. The NAMH, reported to control funds in excess of 15 billion dollars, has in the past exercised considerable influence on

universities and scholars through its power of deciding what research work to support.

At a noon news conference, the Executive Secretary of the NAMH reported that no further research projects will be funded (granted Association monies) unless they are directed at either defining the social implications of or designing social policies capable of helping man cope with possibilities present in man's increasing store of genetic-related knowledge.

Quizzed as to the basis for this decision, the Executive Secretary made a brief statement:

"The number of seriously mentally ill has increased at a rate three times that of population growth. The greatest increase has occurred in segments of our society now known to have had a long history of such illnesses. Despite major public and private efforts to control the conditions believed to foster such illnesses, their numbers have continued to and are increasing with little prospect of change. A crisis is looming, a crisis in which knowledge of genetics as a factor in social policy will be critical. In order to address itself to this emergency, the Board of Directors of the NAMH felt that they had no choice but to focus all available resources of the Association on the field of genetics as genetics has social implications."

News Release Number 5

The Department of Welfare (DOW) released its annual progress report. The report revealed that the Department of Welfare now spends more money than any other federal agency with the sole exception of the Department of Defense. Reading from a prepared statement, the departmental press secretary stated that:

"The number of welfare recipients continues to increase with incredible speed while the living standard of those so assisted declines with discouraging regularity.

The major reason for the lack of progress in this area is associated with the fact that a large number of families have remained on welfare rolls for generations without improving their living standards or reducing the size of their families significantly.

For the forseeable future, the budget of the Department of Welfare will continue to become larger. This will be necessary if we are to maintain the status quo."

Rank-Order Exercise 1: The News Releases (Optional)

The news reports identified above relate to a number of personal and social problems in contemporary America. Suppose you could take steps to correct a number of these problems as listed below. Suppose further that you could only deal with one problem at a time. You would then need to solve the most important problem first, then the second, then the third, then the fourth, and finally the fifth. Show the order in which you would attack the problems listed below by marking the one you would work first with a "1", the one you would focus on second with a "2", etc. until you have rank-ordered all five problems.

_____ The increase in incidence of crimes against persons in large cities.

_____ Physical deformities due to genetic defects.

_____ Growth of welfare rolls without substantial results as measured against personal and social improvement for recipients of funds.

_____ Diseases that can be attributed to hereditary causes.

_____ The need to know more about the social implications and possibilities of new breakthroughs in science and, in this instance, of genetic knowledge.

(Note to the teacher: If you decide to have your students complete this rank-order exercise, you may wish to have them discuss their responses before continuing with the next section of this activity.)

Social and Scientific Context: The Television Broadcast

Aspects of the current scene like those identified in the news releases bothered you as you became aware of them. However, you never bothered to think about them as a group of related information. You become intrigued about the relationships between these reports when you happen to see the television program guide describing an upcoming special. You decide to watch a two-hour, prime-time, television program on the subject of "Genetics and the Future of the Human Race" organized and presented by a group of well-known scholars from many field of scholarship and research. The program is sponsored by one of the major foundations noted for its reputable and high quality productions.

As you watch, you learn that these scholars (from such fields as science, philosophy, the humanities, education, theology, medicine, social science, and psychology) have been meeting with one another for over five years. You learn that they have done extensive research and reading in the areas related to human heredity and genetic loading. You learn that they have set up several corresponding committees to share and examine their feelings. As a result of their association and work, these scholars have become convinced that the United States if facing a major social catastrophe. Furthermore, they have predicted some conclusions and likely outcomes warrented by the overwhelming empirical evidence and have agreed on a list of policies necessary for the preservation of our nation and its culture of science and of man.

For the first hour the panel presents supporting data and evidence and identified and elaborates on five conclusions that must be drawn from the data. These conclusions are as follows:

Conclusion 1. While mankind has increased his life span and kept alive individuals who would have dies were it not for advances in medical knowledge and technology, man has not improved his species. He has instead endangered it. Persons possessing inferior survival qualities due to genetic inheritance have not died. They are being kept alive and are transmitting these inferior traits to others. The "genetic pool" of the human species, instead of becoming stronger through teh operation of principles of natural selection, is, in reality, becoming polluted with inferior, weakening genetic qualities.

Conclusion 2. As our "genetic pool" continues to weaken, a greater number of persons in our population will become victims and transmitters of hereditary defects. The end product will be a gradual increase in the number of all hereditary diseases, defects, and deformities.

Conclusion 3. The nonselective use of medical advances to help potential polluters of the genetic pool to remain alive will further weaken the genetic resources of man. This will result in a downhill spiral of the human species.

Conclusion 4. As society we can determine that we will use scientific knowledge to protect the human species. Adequate knowledge concerning genetics and heredity exists for man to make rational policies directed at how such knowledge will be used and to protect man from its irresponsible use. Current genetic knowledge can be coupled with the technical skills and equipment of the medical profession for our society to make substantial gains in population control through genetic selectivity.

Conclusion 5. Man is much better equipped with knowledge of genetics, heredity, and selective population control than he is with rules and procedures for developing and implementing ethical and moral policies by which such knowledge can enable man to improve himself individually and socially. The group feels a moral and social obligation to present its recommendations to the public in order to initiate discussion among and action by groups of concerned Americans. The results, it is hoped, will be the enactment of laws by th legislatures, the interpretation of the law by the courts, and the enforcement of the law by the executive departments of various levels of government designed to prevent a national disaster.

During the second hour of their presentation, panel members recommend the following policies very deliverately considering the social consequences of each policy in terms of scientific, social science, humanistic, educational, religious, and philophical implications. The policies so recommended by the members of the learned panel are as follows:

Policy 1. Require all citizens to undergo a standard genetic analysis profile to determine the extent to which they carry defective genes.

Policy 2. Sterilize immediately all individuals who possess mental or physical abnormalities associated with genetic defects and, in the future, destroy such persons at birth.

Policy 3. Sterilize all persons capable of transmitting defective genes to an offspring.

Policy 4. Sterilize all persons born into families with long histories of criminality, unemployment, vagrance, poverty, or mental illness.

Policy 5. Sterilize all children who score less than 70 on a standard intelligence test at the time they attain puberty.

Policy 6. Enact these policies into national law without delay and create a Bureau of Genetics to administer and to enforce these policies rigorously.

Policy 7. Develop new and relevant codes of ethics related to the use of social and scientific knowledge.

With the last policy recommended, the panel leader apologized for burdening the lay citizen with such weighty concerns and prayed that they would think, decide, and act before it was too late to act.

Rank Order Exercise 2: The Television Broadcast (Optional)

All of us assign more importance on some people than we do on others. Those important to use are likely to influence the way we behave and to be significant to use as agents who help us to appraise our performance as human beings. On the other hand, when these people violate our expectations, we are frequently upset and sometimes outraged. Below you will find a number of persons who were represented on the panel. Mark the person you would be most outraged (or surprised) to find making these recommendations with a "1", the person who next most outrages (or surprises) you with a "2", etc. until you have ranked all the persons listed.

_____ a family doctor

_____ a religious leader (minister, priest, rabbi, etc.)

_____ a political leader (know for his humanitarianism)

_____ a scientist

_____ a social worker

_____ a psychiatrist

(Note to the teacher: You may wish to add to or change this list of persons to be more suitable to the unit, community or class you are teaching. Also, decide if you want to have your students complete this exercise. If so, you may wish to have them discuss their responses before continuing to the next section.)

The Social and Scientific Context: The Political Scene

Your reaction to the television broadcast is mixed. You are glad they chose you to speak and wish they had not. You are moved to support the policies they recommended and feel compelled to reject the policies recommended. You are not alone. Americans ally themselves into groups, some supporting and some rejecting the conclusions and recommendations of the panel; some accepting the conclusions but rejecting what they call the unwarranted redicalism of the recommendations; some recommend accepting some of the recommendations after calmly considering all the alternatives, both those offered as well as those not offered by the panel; and some want to implement all the policies without any change whatsoever immediately. In effect, Americans polarize themselves into groups favorably disposed toward panel members and groups strongly opposed to panel members. Your friends belong to both camps and each side seeks to persuade you. Their efforts become more insistent during the conduct of preconvention presidential primaries in which two candidates compete to win the nomination of your political party in order to run against the man who has occupied the White House for the last four years. It is during the course of this competition for the nomination that you begin to sort your ideas and values about this subject.

Two men contested for the nomination of our party. The favorite condidate thought he sensed an issue and a program that would vault him not only into the presidential nomination of his party but into the White House as well. In general, he spoke of the commitment, the concern, the scholarship, and the responsibility with which the panel had acted. While he stopped short of accepting all the recommendations, he did commend all policies as being worth of careful consideration.

A second man who was seeking the nomination of your party but given little chance of obtaining many primary election or convention votes also sensed that the panel had presented him with an issue he could employ.

"If elected," he began to tell his small audiences, "I will take immediate and effective steps to limit further research in the field of genetics. I will classify as 'top secret' all genetic knowledge now available that contains potentially damaging consequences for our people. All those who advocate the cold scientific use of genetic knowledge and fail to have human compassion will find themselves facing an implacable enemy who will take steps to make certain that those who preach their creed are not supported directly or indirectly by federal monies."

In response, the favorite candidate spoke of the social irresponsibility and irrational behavior of his opponent. And he publicly affirmed, in large part, the work of the panel that had presented the broadcast.

When the dust had settled from the major primaries critical to securing the nomination, the favorite had won all of them. However, whereas he had been expected to win the votes of from sixty to sixty-five percent of the party faithful, his greatest margin was fifty-three percent of the vote; and in two states, his challenger surprised everyone by carrying more than forty-nine percent of the vote. In effect, had the dark horse candidate secured an increase of less than one percent in these two states, he would have entered the nominating convention with a good chance of winning the nomination of his party. Consequently, the favorite's stand with regard to the recommendations presented by the panel had almost cost him a nomination he appeared to have had wrapped up prior to the television broadcast.

While the two aspirants for the nomination of your party were forced to react immediately to the television broadcast, the man who already occupied the White House and whose nomination was assured had time to gauge the winds of public opinion. Observing the success that the unsuccessful candidate had had with the issue, the President built his re-election campaign on the pledge that "The people will decide. The general will will be done." He proposed that if elected and if given the support of majorities in both the House and Senate he would conduct a national referendum to let the "people decide." The plain citizen, Mr. Average American, "in which the wisdom of the nation had always been cherished and protected" would be allowed to determine the direction of policies involving the use of genetic knowledge. "I will go to the people and the people will be heard" announced the President when the accepted the formal nomination of his party. His opponent, having committed himself during the primaries, had no room in which to maneuver for he had already endorsed the recommendations of the panel of scholars.

Not surprising the, the President won his bid for re-election and carried majorities from his party into both the House and the Senate. True to his campaign pledge, given the vote of the people and the majorities in both houses he requested, the President appointed a blue-ribbon committee to draw up possible policies concerning the search for and use of genetic knowledge especially as it relates to the problem of "genetic loading." The committee is to examine relevant data and to consider every possible alternative in coming up with its recommendations. The President told the nation that these recommendations will be presented to the people for their consideration within ninety days of the completion of the committee's work. The people would then be allowed to make their will known to the Congress and to the world.

Having completed their work, the committee handed its recommendations to the President. It is now time for the national referendum.

Rank-Order Exercise 3: The National Referendum

At this time, you are about to cast your vote in the national referendum. You are not given an option of expressing your feelings and preferences toward the original policies suggested by the panel of scholars. Instead, you must rank order a number of possible public policies identified and compiled by the committee appointed by the President. When you have finished studying the background leading up to this vote secure a "ballot" and rank order the choices given from the best to worst.

BALLOT

NATIONAL REFERENDUM TO DETERMINE THE GENERAL WILL WITH REGARD TO GENETIC KNOWLEDGE: IN ACCORDANCE WITH COMMITMENTS OF THE PRESIDENT AND LAWS ENACTED BY CONGRESS

Rank order the following policies from the one you most prefer to the one you least prefer, using the numbers 1, 2, 3, etc. to designate your opinions.

_____ Destroy all existing evidence, equipment, theoretical papers, and other published materials associated with the social application of genetic knowledge.

_____ Monitor the activity of scientists engaged in genetic-related research and censor all monographs and books that

such scientists seek to publish or publicize at national meetings requiring that they cross state lines.

_____ Cut off all funds and support mechanisms for research, development and disseminations of genetic knowledge. Pursuant to this goal, withdraw the tax-exemption privileges of private foundations funding such work.

_____ Allocate no new federal funds to help in genetic research.

_____ Confine or deport scientific and social leaders who continue to support and advocate policies such as those recommended by a recent and notorious group using television channels that belong to the people.

_____ Request the resignation of all governmental scientists and departmental officals who have advocated the exploration or design of policies based on genetic knowledge.

_____ Marshall a force of agents trained in the skills of technicians to seek employment with and report the activities of scholars and scientists associated with or suspected of being inclined to support policies based on the protection of or a concern with genetic loading.

_____ Collect all scientific equipment purchased by individuals pursuing this line of research as part of a research grant funded by the government. This includes hardware (instruments) and software (reports and books) developed using federal money and which in truth really belong to the people.

_____ Identify scientists known to support genetic-oriented policies. Instruct broadcast stations (radio and television) that to provide favorable coverage to them or their work is at the risk of their license with the FCC.

_____ Provide funds for the development of instructional materials for use in elementary, junior high, and senior high school classes. Such materials will stress the evil consequences present in genetic research and the application of genetic knowledge. Require no less than two six-week units between grades 7 and 12 for a student to obtain a high school diploma.

Discussion Starters

1. In your own words, briefly describe the situation presented in this episode as you experienced it. What circumstances did you have to deal with? What feelings were aroused? What actions did you want to take?

2. In terms of the situation presented here, how can scientific knowledge and inferences drastically affect personal, social, and political behavior?

3. When the scientist begins to explore ways of applying his knowledge in order to influence personal, social, and political behavior, he must risk controversy. How would you explain this facet of the work of the scientist?

4. How can personal, social, and political decisions influence the work of the scientist?

5. Should man be concerned with genetic loading? List consequences that support your position.

6. Supposing you wanted to justify man engineering his development as a species. How would you argue?

7. How might genetic knowledge be used to support a policy of national genocide?

8. Develop the outlines of an ethical code of conduct for scientists interested in genetic engineering that would make you feel secure.

9. Frame you won set of policies (make this the list that you would have preferred to find in the national referendum). How does your set differ from those offered by the panel? From those you found on your ballot?

The rank-order format of the value sheet stresses the hierarchial characteristics of man's belief and disbelief system. This format also stresses the need to have students discriminate between choices in terms of relative goodness and badness. It serves to help students examine their preferences in order of of their priority. It can serve as a jumping-off point from which a student can explore the consistency of his preferences based upon some criterion.

The Classification Format

The classification format of the value sheet presents students with a situation and with a number of choices. It differs from the rank-order task in that students here are asked to group (classify) choices that they prefer and to group other choices that they do not prefer in terms of the situation presented. The emphasis in the classification format is placed on the group of choices as a whole rather than on individual choices. This forces students to apply the same reasons, grounds, norms, or bases to all the choices to come up with a group of choices. Typically, students are presented with at least nine choices, three of which are to be classified as best and three of which are to be classified as worst.

IN PURSUIT OF THE GENERAL WELFARE

Preparation

1. Secure copies of the following for each student:
   a. the social and scientific context
   b. the group decision-making guide
   c. the list of thirteen possible policies
   d. the subcommittee report form
   e. the consequential analysis form (optional)
2. Decide whether you intend to spend three or four days or wish to invest less time in this activity. If you only wish to use one or two days, modify the assignment for students making subcommittee assignments more realistic for this time span. For example, distribute the social context situation to be read as homework and limit the assignment to the identification of positive and negative policies.

3. Decide how you will group students for this activity. Some options are:

   a. divide the total class into groups of four to seven students and let each group function as a subcommittee;

   b. have five students role-play the actions of a decision-making committee while the other students observe; or

   c. develop criteria as to how members of a decision-making group can be most effective. Have different groups of five students role-play while the other students observe and periodically (every ten minutes?) provide the role-players with feedback.

4. Identify vocabulary words likely to cause difficulty for your students and develop a glossary (on ditto or on the board).

5. Make sure students understand the situation before they begin attempting to sort out the alternatives from which they are to make a decision.

6. Call attention to the study guide and ask students to work their way through it prior to public discussion. (Do this regardless of the grouping option you decide to use.)

Social and Scientific Context

The time is the not-too-distant future. The place is a place near the United States with a culture and society much like the culture and society of the United States. The country is named Mirania and objects associated with its culture are called Miranian. Due to its limited physical size, Mirania has only local government boards and a national government. All laws are made by a one house Congress called the General Assembly. Except for the differences in size and the absence of state governments, Mirania is very much like the United States. A person born and educated in the United States would experience no culture shock were he to imigrate to Mirania. Miranian values and norms are much the same.

Miranian legislators are elected once every four years. The country's President serves for four years and is eligible for no more than two terms in the office. As in the United States, the Supreme Court judges are appointed by the President

with the advice and consent of the General Assembly. Many other similarities exist between the two countries. Miranian visions of the "good life" are much the same as are many of the same social and environmental problems.

The quality of life and the Miranian life styles have made Mirania a highly desirable place to live. Demographers have warned that unchecked population growth will destroy the Miranian nation and culture. However, members of the General Assembly have been more committed to talk about the impending disaster rather than to take any action which would prevent such catastrophe.

The General Assembly has advertised in other nations that Mirania faces a critical population problem within the next two decades. The Assembly has funded voluntary groups concerned to disseminate information about birth control. Schools are provided increased funds if they develop and teach units labelled "sex education" but whose primary emphasis is birth control information. The effects of these efforts are, at best, delaying. Emigration continues. Births mount while medical research continues to keep the aged alive. The population continues to grow.

Worried about the results of this growth, concerned citizens are stirred to join groups interested in taking specific and immediate action. Eventually these groups unite to win control of the General Assembly and to elect a "population control" President. The public has given the national government a mandate to do something to check the population growth.

The newly elected General Assembly is committed to the identification of policies that will limit population growth. The leadership of the Assembly believes that policies enacted into law should shock the unconcerned into becoming more alert, should immediately slow down population growth, be relatively inexpensive over the long run, and provide for the maintenance and improvement of the quality of life for the citizens of Mirania.

For purposes of this exercise, you are a Miranian legislator elected to the General Assembly as a population control candidate. You received nearly 63 percent of the votes in your district.

The major committee to which you are assigned is the Population Control Committee. As a member of that committee, you are also appointed to serve on a subcommittee the primary purpose of which is to consider the general area of the appli-

cation of genetic knowledge and to recommend policies that the full committee can propose as properly written bills to the General Assembly. The odds are strong that the recommendations of your subcommittee will be bills proposed to the Population Control Committee. The odds are even better that whatever bills the Committee recommends will be enacted into law by the General Assembly and signed by the President.

Decision-Making Guide

As a result of months of investigation and study, you and other members of the subcommittee have identified thirteen possible policies that your government could enact and enforce. You have agreed as a group to present the full committee with the following.

a. a listing of the three policies that your subcommittee believes should be written as bills and become law immediately;

b. a listing of the three policies that your subcommittee believes are unworthy of further consideration;

c. a statement of your subcommittee's basis for recommending the three policies selected;

d. a statement of your subcommittee's reasons for believing the second three are worthy of no more consideration;

e. a third listing made up of those policies neither recommended or rejected; (Note to the teacher - this activity is optional.)

f. a listing of the likely social and environmental consequences likely to occur if each of your recommendations becomes law. Each policy proposed should have its consequences explored individually. (Note to the teacher - this last activity is optional.)

Before reaching a decision as a group, your subcommittee has agreed to follow three simple procedural rules. These are:

1. Each member of the subcommittee will independently rank order all thirteen policies from the most desirable to the least desirable.

2. Disagreements between individual members of the subcommittee are to be resolved through discussion and

persuasion. You cannot and will not allow a decision by simple majority vote.

3. Final decisions of the subcommittee will be summarized and signed by all members of the group to signify that the decisions are agreeable to all members of the subcommittee.

The List of Thirteen Possible Public Policies Related to Genetic Knowledge and Its Applications Identified by the Subcommittee

1. Provide monetary subsidies to parents found to possess superior genetic qualities likely to be transmitted to offspring.

2. Levy a birth tax on parents found to possess inferior genetic qualities likely to be transmitted to offspring.

3. Sterilize permanently at puberty all boys and girls found to possess inferior genetic qualities likely to be transmitted to offspring.

4. Require genetic analysis tests as a bssis for securing a marriage license. Where inferior genetic qualities are detected, no license will be issued until such time that both parties provide documented evidence that they have been sterilized.

5. Automatically abort all pregnancies conceived out of wedlock with fines or imprisonment as penalties for the parents.

6. Require genetic analysis as a condition for granting passports for tourists wishing to travel to Mirania or for immigrants wanting to migrate to Mirania. Those found to possess inferior genetic qualities will not be permitted to enter the country.

7. Require all females who reach the age of thirty-five to obtain sterilization or to have all pregnancies conceived after this age automatically aborted since genetic defects are more likely to occur in offspring conceived by females once they reach this age.

8. Abort all fetuses found to possess transmittable genetic defects or destroy at birth all babies found to possess physical defects or mental abnormalities due to genetic or womb environmental causes.

9. Deport or confine all individuals capable of transmitting inferior genetic qualities to an offspring.

10. Issue pregnancy permits allowing three children to those parents likely to transmit superior genetic qualities to offspring and to those unlikely to transmit superior genetic qualities permits allowing only one child.

11. Drop all government assistance to institutions and organizations that seek to maintain the life of individuals possessing mental or physical defects due to genetic causes.

12. Enable parents, relatives or doctors to secure euthenasia permits to relieve the personal and social consequences of keeping the genetically inferior or mental or physically defective alive.

13. Provide annual tax incentives for parents who possess inferior genetic qualities likely to be transmitted to offspring and who avoid conceiving children.

Report Form

Population Control Subcommittee Report Form

1. Based upon genetic knowledge, the three policies that should become law are:

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

2. Based upon genetic knowledge, the three policies that should not be considered further are:

   a. _____

   _____

   b. _____

   _____

c. _____

_____

3. The basis for selecting the first group of three as desirable policies is:

_____

_____

_____

_____

_____

4. The grounds for selecting the last group of three as undesirable policies are:

_____

_____

_____

_____

_____

5. Three other policies that should be given serious consideration at a later data are:

a. _____

_____

b. _____

_____

c. _____

_____

Signed _____

_____

_____

_____

Consequential Analysis Form (Optional)

CONSEQUENTIAL ANALYSIS GUIDE FOR RECOMMENDED POLICIES

Policy	Important Social Benefits of the Policy	Important Negative Consequences of the Policy
1.	1.	1.
	2.	2.
	3.	3.
2.	1.	1.
	2.	2.
	3.	3.
3.	1.	1.
	2.	2.
	3.	3.

Consequential Analysis Form (Optional)

CONSEQUENCES ANALYSIS GUIDE FOR REJECTED POLICIES

Policy	Important Social Benefits of Rejecting the Policy	Important Social Costs of Rejecting the Policy
1.	1.	1.
	2.	2.
	3.	3.
2.	1.	1.
	2.	2.
	3.	3.
3.	1.	1.
	2.	2.
	3.	3.

Discussion Starters

1. What potential uses can man make of genetic knowledge?
2. How will the values of our society influence the genetic scientist who presents alternative ways his knowledge might be used?
3. How will the knowledge gained by the genetic scientist influence American society?
4. What fears do you have of applying scientific knowledge to human problems?
5. How might the applications of genetic knowledge affect our laws? religions? hospital services?
6. Are there any good uses for genetic knowledge? for whom?
7. In our society, some men are committed to science and others are committed to public service. How much faith can you invest in the hope that these experts will use their knowledge for the general welfare?
8. What general social significance can be attached to the fact that in an age concerned with pollution, man continues to "pollute" his genetic pool in the phenomenon referred to as "genetic load"?

The classification format of the value sheet is designed to help students generalize their value orientations. This format also enables students to explore the relative consistency of the criteria by which they choose to believe and the criteria by which they choose not to believe.

The Criterion Format

The criterion format of the value sheet stresses that as one changes his criteria for making decisions and for determining his preferences, he will make different decisions, stress different aspects of the situation, consider different conse-

quences, and take different risks. The criterion format of the value sheet always has at least five elements. First, because of its complexity, detailed directions for students are necessary. The teacher may need to review these directions with the class to make sure that they are understood. These directions may be accompanied by a contrived situation designed to provide focus for the tasks to follow. A second element contains a universe of statements that the responding group must accept as true for purposes of the exercise. A third element contains a number of choices; students either select the best choice possible, rank order the choices given, or classify the choices given. Fourth, a list of criteria is provided for students to use as the basis for making their decisions and identifying those elements of the universe of facts most germane to them. The fifth element consists of a decision sheet or sheets that students use in order to record their decision and weigh consequences.

GENETICS: GODLY OR SATANIC PURSUIT?

Preparation

1. Secure copies of the value sheet for each student. This value sheet has the following components: a) a set of directions that should be presented on a separate sheet; b) a group of possible public policies related to the use of genetic knowledge; c) a long list of social consequences that might be anticipated as effects of genetic breakthroughs; d) a set of criteria statements (grounds) on the basis of which policies are to be selected; and e) a worksheet on which students are to record and save their work. Because students will need to manipulate these components as they complete this task, distribute the

elements separately and explain what each contains before distributing the second piece, the third, etc. (Once students have become accustomed to using this format, this amount of deliberateness and teacher imposed structure will become less necessary.)

2. Identify vocabulary words likely to cause difficulty for your students and develop a glossary (on ditto or on the board).

3. After all five pieces of the value sheet have been distributed, divide students into decision groups with a minimum of five participants in each group. Encourage students to first read the entire value sheet; then to spend the remainder of the first instructional period sharing ideas and making sure that they understand their assignment.

4. For each group, either appoint or ask members of each group to identify:

   a. a chairman whose first task is to make certain that the group focuses on the directions and make sure that the group fulfills its task;

   b. a recorder whose primary responsibility is to keep a record of how the group performs and fill in his group's worksheet as their work progresses;

   c. a participant whose primary focus is on possible social consequences and what is meant by each item on the list;

   d. a participant whose primary focus is on the list of policies from which the group is to choose those policies which they would support; and

   e. a participant whose primary focus is on the list of alternative criteria from which the group is to identify a basis for each policy they choose as the one that they would support.

5. Decide whether you want students to fulfill the entire assignment as provided or whether they should just select the best policy.

6. Expect to use one day helping a group new to this format to understand and comprehend the materials and their assignment. A second day will probably be

required for students to work their way through the materials and build their decision sheets. If you wish to allow groups to share ideas formally, at least a portion of a third day will be necessary.

Directions

1. Make sure that you and each member of your group understands all directions and each element of this learning task before you start working. Stay calm and work carefully through each step. By the time you finish one or two explaining activities, you'll be much more comfortable with it and able to risk shortcuts without risking failure.

2. Select the policy that you would most prefer to see the United States adopt with regard to the use of genetic knowledge from the list provided. This is the policy that your group agrees on as most preferable to them as a group.

3. Once you have identified the most preferable policy to your group, identify the good (positive) consequences you would expect to follow the adoption of the policy you have selected. Then identify the bad (negative costs) your group is willing to accept if it adopts this policy. Help your recorder to record this work on your decision sheet.

4. Having explored the consequences of the policy you selected as most preferable, identify the one (1) criterion statement that is the best basis for your policy.

5. Before proceeding, examine as a group whether or not your criterion is consistent with your policy and with the consequences you identified.

6. Proceed to select the second most preferable policy, identify its consequences, locate the best criterion on which you can ground your policy, and make sure, again, that your policy, the consequences you have identified, and the ground for making your decision are consistent with one another.

7. Select the third most preferable policy and proceed as you did in direction #6.

8. Select the worst of the seven possible policies, identify its consequences, and choose one criterion statement that will support your contention that it is the worst of the policies listed in your list of possible policies.

9. Help your recorder to make certain that he has an accurate record of the decisions your group has made. If he has, each member should sign it to signify that he believes it to be an accurate account.

10. Discuss how you worked together as a group and how you might improve your performance the next time you are working in a task that stresses explaining group decisions on the basis of anticipated consequences and according to specified grounds.

List of Policies

I. Citizens should insist that their legislators support the work of genetic scientists if and only if the work of these scientists is directed at the detection, correction, or destruction of defective genes. And once this knowledge is secured, citizens should insist that their legislators pass laws requiring that persons known or suspected to have defective genes must submit themselves to genetic surgery or other recommended procedures likely to protect society from persons possessing defective genes.

II. Citizens should encourage their legislators to support scientists committed to the study of cloning. These scientists should be encouraged to duplicate creative artists, scientists, thinkers and leaders. They should also have adequate support to observe and study their creations to determine if reproduction by cloning also maintains and conserves the creativity of the persons "copied" by cloning.

III. Scientists should create unique humanoid creatures capable of living and studying in environments hostile to mankind. Such creatures could explore the sea and deep space more effectively than man can using himself and his technological extensions (tools, spaceships, submarines, etc.) of himself. Since space and the ocean are man's last frontier, these frontiers must be opened up for exploration, exploitation, and possibly for settlement.

IV. Citizens should create a lobby to support legislation designed to screen out and prevent genetic defective adults from participating in the conception of children. The first piece of legislation should require all persons applying for a marriage license to present proof of genetic analysis as well as a blood test. Where the male is found to have genetic defects, he should be required to agree that any children conceived will be the product of artificial insemination and submit to permanent sterilization. The female, if she has no genetic defects, should be required to sign two affidavits. In the first, she would commit herself to accept artificial insemination at a publicly controlled center using sperm with the characteristics of the donor carefully detailed. In the second, she formally signs an agreement to the effect that children so conceived will be made available to scientists for testing and study in order to advance genetic knowledge. Where both parties are defective, marriage licenses should be denied unless both parties present proof of sterilization.

V. Citizens should push scientists to take immediate steps to correct the problem of genetic loading. Since medical advances have maintained the life of individuals who would have died in the past and contributed to the polluting of the human genetic pool, the new frontier of genetic science should be required to stress the discovery and use of means for removing undesirable traits from the genetic pool of man.

VI. Citizens should immediately support legislation by which criminals convicted for life for crimes of passion can volunteer as subjects for genetic experiments and genetically relevant research into life. After a number of such experiments and studies, graded according to risk, these individuals should be freed in return for their services to humanity. Prior to their release these individuals would need psychiatric clearance that they do not constitute a risk to society.

VII. Citizens should support studies, institutes, and clinics in order to encourage the development of machines capable of duplicating the womb environment of the female. Parallel with these efforts, scientists should continue to seek synthetic substances to replace the human cell as a means for reproducing life. This

will enable man to reproduce his species without risking defects attributable to such factors as genetic loading and radiotion. It will also free women from their role as childbearer and homemake and make them more equal.

Possible Consequences of Genetic Knowledge That Can Be Anticipated

1. Elimination of all hereditary disease and deformities from the human race.

2. Creation of a "super race" possessing those characteristics deemed most essential for human beings to possess.

3. Development of an elite class of superior individuals especially bred to fulfill vital leadership roles in society.

4. Creation of specialized classes of individuals bred for specific social functions such as research, recreation, service industries, accounting, etc. so that all workers engage in jobs for which they are fitted.

5. Duplication of individuals dangerous to man, men such as Hitler, Stalin, etc.

6. Duplication of individuals helpful to man, men such as Salk, King, Pericles.

7. Duplication of superstars who would dominate different sports and be bred especially for basketball, football, wrestling, archery, bowling, tennis, and baseball.

8. Preservation of the life, thought and moral influence of individuals victimized by untimely accidents and assasinations, for example the Kennedy or the Grachii brothers.

9. Population control and zero or less growth.

10. Elimination of sexual stereotypes about males and females.

11. Preservation of reproductive cells (sperm) for eventual emergency use.

12. Alteration in the meaning of such words as born, life, death, human, father, mother, etc.

13. Modification of religious faiths and conceptions about God.

14. Introduction of the concept of property rights as a sexual question.

15. Alteration of contemporary laws relating to individual rights to life, due process, privacy, equal protection, etc.

16. Preservation of human life for two, three, or more centuries.

17. Replacement of "money" bankers in prestigious offices such as school boards by "genetic bankers".

18. Elimination of individuals currently draining resources of the state.

19. Appearance of a class of society made up of two castes: humans born of human parents and humanoids produced in the laboratory.

20. Production increases in agricultural products through cloning.

21. Organization of alternative schools to socialize and educate different kinds and types of human beings.

22. Creation of a climate in which atomic warfare (now unthinkable according to some because of the effects of radiation on genes) would be quite acceptable since man's genetic ability to reproduce is possible regardless of radiation level.

23. Creation of a meritocracy.

24. Rejection of science by society.

25. Increase efforts by science to control the human mind as effectively as they can not control the human physical body.

26. Creation of a more humane, ethical and more moral society.

27. Emergence of totally planned society.

28. Revolution in veterinary medicine.

29. Revision of the Hippocratic oath as a code of ethics for doctors and nurses.

30. Replacement of contemporary man with "future man".

31. Elimination of pain and suffering due to diseases now common to the human race.

32. Reduction in the risk of birth defects for children born of men and women in high risk professions such as radiologists, astronauts, x-ray technicians, etc.

33. Disappearance of human freedom as we now know it.

34. Incorporation of genetic counseling in sex education courses.

35. Elimination of all value we place on human life.

36. Alteration of intelligence rooms for the human species.

37. Creation of class warfare between human-humans and created-humans.

38. Creating the need for genetic counselors.

39. Transformation in the major role of hospitals and medical centers.

40. Creation of humanoid "slave class" to do the difficult and dirty jobs now being done by human beings.

Criterial Statements

A. Man is a gregarious and social animal who lives and survives in groups. The individual must submit to rules, regulations, and procedures that serve the interests of his total society. To do less is to be selfish, anti-social, and antiman.

B. Science cannot and should not concern itself with the religious beliefs and conventional faiths of a time and place. The purpose of science is to discover new knowledge, to describe the future.

C. As far as we know man is the only conscious creature in the universe who is aware of himself as having once not been and of facing a time when he will no longer be. His highest ethic must be to preserve and protect himself as a species. His highest moral responsibility is to protect those who will follow him, his posterity.

D. The pursuit of scientific knowledge cannot be restricted. Without the continued freedom to search where they will and perform necessary experiments scientists will be unable to function and science will die. With the death of the spirit of scientific inquiry we will rapidly lose our individual freedoms, our sense of personal dignity and worth, and our ability to progress. Society as we know it will wither and decay.

Note to recorder: Please attempt to express ideas in the words used by members of your group. Do not copy the statements of policy, of consequence, or of criteria.

DECISION SHEET 1

The most preferable policy is:
(Summarize policy in your own words)

Anticipated consequences of this policy are:

Positive (benefits for man as a species)

If you need more space use the back of this page.

If challenged to justify this policy and to provide a reason for accepting the bad effects listed to the right, the best criterion statement is:

Negative (benefits for man as a species)

If you need more space use the back of this page.

DECISION SHEET 2 (Optional)

The second most preferable policy is:
(Summarize policy in your own words)

Anticipated consequences of this policy are:

Positive (benefits for man as a species)

If challenged to support this policy and to provide a reason for accepting the bad effects listed to the right, the best criterion statement is:

Negative (benefits for man as a species)

DECISION SHEET 3 (Optional)

The third most preferable policy is:
(Summarize policy in your own words)

Anticipated consequences of this policy are:

Positive (benefits for man as a species)

If challenged to justify this policy and to provide a reason for accepting the social costs listed as negative consequences, the best criterion statement is:

Negative (benefits for man as a species)

Discussion Starters

1. To what degree is the science of genetics likely to influence contemporary American society? future American society?

2. To what degree is the nature of Western Society (especially America) likely to influence the development of the science of genetics?

3. Will the scientist who is associated with genetics come to be perceived as a godly figure? Explain your response.

4. If it is acceptable or "good" that scientists can alter heredity because of genetic research, are there any areas of human existence that should be off-limits to the scientist?

5. Might society be considered "good" if it prevented the scientist from experimenting in the area of genetics?

6. To what degree does man need to be aware of his ancestors in making decisions affecting the human beings of the future? Should this awareness limit his efforts to affect his descendants through applying genetic knowledge?

The criterion format of the value sheet enables students to identify the elements that they use in determining decisions and examining their values. This format also helps students analyze the relationships that exist among four elements (criteria, possible policies or decisions, the data bank, and probable consequences).

Protocols

Writing Different Formats of the Value Sheet

The value sheets presented above were written as examples that could be incorporated into a unit of instruction as a means of securing value clarification language patterns from students. One intent was to familiarize the reader with six alternative formats, each of which can be designed and used in conjunction with a broad range of science units (as well as social studies, humanities, professional programs, and vocational fields). A second intent was to enable the reader to comprehend how the alterntive formats and follow-up questions can be used to help students fulfill the standards of language usage described in the four phase model of value clarification. A third intent was to help the reader learn the elements of different value sheet formats and follow-up questions to the degree necessary to plan his own value sheets.

When the teacher writes his own value sheets he can focus them more directly on the unit he plans to teach. When the teacher writes his own value sheets he can deliberately highlight elements of the community in which he teaches and aspects he believes his students will find meaningful. This section is intended to provide step-by-step directions for writing each of the six formats.

To develop a value sheet in the standard format:

1. Select a reading, a cartoon, a poem, a picture, or a selection from a novel or essay that contains sections or elements relevant to the topic or concept you are teaching.
2. Abstract those elements of long readings or poems that you want to stress, or paraphrase the situation following a source.
3. Write two-or-three questions designed to help students comprehend the resource selected and abstracted (or paraphrased).
4. Write two-to-three questions that will enable students to relate the resource to the concept or topic you are teaching.
5. Write questions designed to elicit at least two of the following: preferential statements, consequential statements, criterial statements, imperative statements, and emotive statements.
6. Identify the appropriate spot in the instructional sequence you are teaching to assign and discuss the value sheet.

To develop a value sheet in the forced-choice format:

1. Locate a source (magazine article, selections from a novel, etc.) that describes a situation relevant to the topic you are studying.

2. Frame and state three to five possible reactions to the situation (these can be consequences, policies, preferences, criteria, feelings, or interpretations).
3. Make sure the choices listed are homogeneous, i.e., that all are cast as the same form of statement.
4. Determine that all your choices tend either to be good or bad in order to encourage students to differentiate their values in responding.
5. Develop a decision sheet on which the student lists his choice and states the basis for making it (see examples above).
6. Think through or write follow-through questions that will help students to share their understanding of the situation and the choices given.
7. Think through or write follow-through questions designed to help students relate the situation and choices to the concept being studied.
8. Think through or write questions that will help students to clarify their choice and the grounds they used.
9. Identify the appropriate spot in the learning sequence to assign and discuss the value sheet.

To develop a value sheet int the affirmative format:

1. Find a situation in which an individual must make a choice in terms of choo ing either the greater good of several

good things or the lesser evil of several bad things. Human interest stories in newspapers, magazines, or as reported by television are all common sources. So are novels belonging to such classes as science fiction.

2. Rewrite the situation doing the following: Describe a number of aspects that make the situation germane to the unit you are studying; highlight the choices available to the individual presented in the situation; and stress that a decision must be made.
3. End the value sheet with the individual about to make the best decision possible given the situation he is confronting. Cue the student to respond by writing, "If I were this person making the best decision I could make, my decision would be . . . .". Leave room for the student to either choose one of the given options or to <u>invent</u> a choice that he believes is best.
4. Think through or write questions likely to help students share their comprehension of the situation.
5. Think through or write follow-up questions designed to help students fit the value sheet situation into the unit they are studying.
6. Think through follow-up questions likely to secure value clarification statements, especially questions inviting students to express their feelings and identify the consequences of their choices or the decision they invented.

7. Identify the place that you intend to use this activity as you teach the unit you are teaching.

To develop a value sheet in the rank-order format:

1. Identify a situation in a journal, a magazine or some other media that possesses potential relevance to the unit you are planning and with reference to which one can locate a list of choices. These choices can be likely consequences, alternative policies, interpretations, or a list of men (see first or second optional exercise in the sample presented above).
2. Rewrite the situation to stress the context within which students are to engage in value clarification.
3. Develop a list of five to twelve options that are homogeneous. (If you have five policies, seven consequences, and nine interpretations, choose one group or develop a separate rank-order task for each list.)
4. Write or think through clear directions with which you will assign the value sheet you are writing. (If written, preface the value sheet with your directions.)
5. Introduce the items to be rank-ordered by informing the student as to how one rank-orders. "Mark the choice you like best with a "1", the second choice you would mark with a "2", the third choice with a "3", etc. until you have ranked all items. Leave a space prior to each option for students to indicate its rank as they value it. (If the

teacher designates these with capital letters - A, B, C, D - this avoids confusion during discussion.)

6. Think through or write follow-up questions that show comprehension.
7. Think through or write follow-up questions that will help students to determine the relationship of the value sheet to the unit they are studying.
8. Think through or write follow-up questions that will elicit value clarification language configurations.
9. Identify the appropriate day to assign and use this value sheet.
10. Determine what sort of grouping arrangements you want to use. (If you want students to clarify their choices and identify their basis, groups of five to seven will enable more students to participate than will a regular group of twenty-five to thirty-five guided by the teacher.)

To develop a value sheet in the classification format:

1. Locate or contrive a situation that can be made relevant to the unit for which you are planning the value sheet.
2. Identify a minimum of nine choices relevant to the situation and make sure that the choices possess homogeneity (all are statements of consequences, policies, etc.)
3. Develop clear directions for your students instructing them to rank-order the choices from best (number 1) to worst (number 9 or more).

4. Develop a decision sheet on which students can write the following: the three best choices as a group; the basis (singular) for classifying this group as best; the three worst choices as a group; and the basis (singular) for classifying this group as worst.
5. Determine whether it is best for students to complete the decision sheet individually or as members of small groups of five to seven.
6. Think through or write empiric questions relevant to the situation and assignment.
7. Think through or write relational questions for this situation and assignment.
8. Think through or write valuational and feeling questions about this situation and assignment.
9. Identify the day(s) you will assign this value sheet and discuss it with students within the context of your unit.

To develop a value sheet in the criterion format:

1. Locate, contrive or describe the context within which students are to respond to this value sheet and establish its relevance to the unit of study you are planning.
2. Identify a list of effects (good and bad) likely to eventuate if the contrived or described situation is allowed ton continue without human intervention. This list should contain consequences you believe your students would consider bad and others they would consider good presented in random order.

3. Preface the consequences with a statement to the effect that for purposes of the exercise these consequences are a full and true universe; the only effects relevant to the situation are listed and the effects listed are all true.
4. Identify a minimum of three grounds on the basis of which students are either to choose the best policy or to rank order the policies given.
5. Preface the page that contains these grounds with a statement to the effect that for this exercise students are to behave as if only these grounds were pertinent to the decision that is to be made.
6. Identify a list of at least five policies the selection of which will probably lead to some good consequences and, at the same time involve the sacrifice of other good effects that would eventuate from other policy options.
7. Preface the page that contains these policies with a statement to the effect that for purposes of this exercise they are to assume that these are the only policies.
8. Develop a decision sheet that will help the student to list his choice from among policies, state the good effects likely to result from his choice, state the bad effects his choice indicates he is willing to accept or risk, and identify the grounds by which he would argue that the bad effects risked are justified.

9. Write an overview of the exercise that provides the student with information about the five elements in this format of the value sheet: A situation complete with directions for the responding student or group; a universe of consequences; a universe of criteria to be used as the grounds for making a decision; a list of policies from among which a decision is to be made; and a decision worksheet. (If these are to be rank ordered, directions are altered and a number of decision sheets are necessary.)
10. Plan or write the kinds of empirical, relational, valuational, and feeling questions you will use to guide a follow-up discussion relevant to the unit of work for which you are planning the value sheet.
11. Identify the appropriate spot in your unit for assigning and discussing this exercise. (Criterion exercises are most likely to be effective after students have studied a unit in some detail and mastered a great deal of the relevant to the unit that are written in other formats requiring less complex behaviors.)
12. Type or arrange to have the value sheet typed so that you can distribute each element separately with a clear title as well as the prefaces suggested above (#3, 5, 7). (If students are responding to this format for the first time, this enables you to explain each item.)

13. Determine whether you want students to work in small groups or as individuals. (If in small groups, you may wish to plan on making individual members responsible for different elements as the group cooperatively completes the decision sheet.)

If carefully followed, the directions presented in this section will enable classroom teachers to plan each of the six formats of the value sheet.[6] As the teacher becomes adept at using these disciplining steps, he will be able to add his own wrinkles. Disciplined structures do enable individuals to engage in creative but responsible imitation.

[6]Exemplars for the social studies are currently in press as a Florida Education Research and Development Council Bulletin, J. Doyle Casteel and Robert J. Stahl with M. Adkisson and Thomas Gadsden, Jr., Value Clarification in the Social Studies: Six Formats of the Value Sheet (1974). A book designed for pre-service methods course and containing thirty-nine value sheets relevant to a number of curriculum areas is to be published in early 1975 (Goodyear).

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